GAS JOURNAL

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BETTER NEWS

SEPTEMBER heralds the renewal, after a short temporary lull, of the activities of gas associations, both senior and junior, throughout Great Britain, and of other technical, scientific, and professional institutions and organisations, the proceedings of many of which are of direct interest to the gas industry. It has always been the policy of the *Gas Journal* to give a true account of the work of these bodies and to cover as wide a field as possible. Since September of 1939 restrictions of many kinds have been imposed on us, and, of course, the war-time restrictions were severe. Nor has the practical impact of these restrictions—and this applies more particularly to paper supply—been lessened during the four years since the war came to an end. Now, however, 10 years later, at September, 1949, we are allowed more paper, and, within the limits of supply, we look forward with good heart to giving our readers an enlarged and a better peace-time service.

Our hopes and endeavours are to an extent manifest in this issue of the *Journal*—the precursor of a livelier and fuller news and technical service which the changed conditions render possible after a long and wearisome period of frustration. It is indeed with keen pleasure that we present a bigger and better *Journal* today, and we hope that the modifications which we have effected in both type and format will not only appeal to readers but will in fact help them in the assimilation of the increased content of news and technical material.

We write this note on the eve of the annual meeting of the Irish Gas Association, which will be in progress in Dublin as this *Journal* 'goes to bed.' The Presidential Address of Mr. T. D. Hamilton and the 'small works' paper by Mr. T. F. Hastings will be found on later pages. The Association of Public Lighting Engineers holds its annual meeting at Llandudno starting on Monday next and extending till the 16th. The proceedings will have a strong gas flavour. Next Thursday the North British Association of Gas Managers stages its annual meeting in Edinburgh. Towards the end of the month the Wales and Monmouthshire Association meets in Cardiff, the Midland Association at Oldbury. These are a few of the September events. Naturally we welcome the opportunities for less confined and constricted journalism which are offered by the easing of the paper situation.

Already the first meeting of the junior associations—that of the Northern Juniors—has taken place. And this brings us to a further item among our plans. There are now in Britain no fewer than 10 junior associations which meet frequently to discuss what, throughout the sessions, amounts to a huge amount of technical fare. With the paper at our disposal following the war, when the junior bodies re-started work in earnest and with redoubled vigour, there was no possibility of coping with the papers effectually in the *Gas Journal*. We simply had not the space at our command. It was for this reason that we started publication of *Gas* in 1946 to cover the activities of the junior associations and to provide the official record for subsequent publication of *Junior Transactions*. This experimental venture met with scant support from the juniors themselves, and we terminate publication of *Gas* with the September issue. In any event *Gas* was in the nature of an expedient, and we have no intention whatever of lessening our interest in or our support of the junior organisations which in fact we have given without fail since their inception. The paper supply at our disposal —limited though the increase is—will now enable us to reabsorb into the pages of the *Gas Journal* the cream of the multitudinous papers presented at gatherings of the junior bodies.

To end this note and explanation we would add that original thought and exclusive articles will find more substantial place in future issues of the *Gas Journal*, now that the door of opportunity has been at any rate partially opened. And this facet we regard as one of the brightest among the brighter things to come.

GAS CONSULTATIVE COUNCILS

SECTION 9 of the Gas Act deals with the form and duties of the Gas Consultative Councils, nearly all of which have now been appointed. This Section is quite clear and doubtless the Minister will expect results—results which only time will reveal. It is, indeed, a strange commentary on the nationalised fuel industries that their architects must form, and appoint, separate honorary bodies whose function it will be to consider 'any matter affecting the supply of gas in the area, including the variation of tariffs and the provision of new or improved services and

facilities within the area, being a matter which is the subject of a representation made to them by consumers or other persons requiring supplies of gas in that area, or which appears to them to be a matter to which consideration ought to be given apart from any such representation, and where action appears to them to be requisite as to any such matter, of notifying their conclusions to the Area Board' and 'to consider the report to the Area Board on any such matter which may be referred to them by that Board.'

These are the duties with which the Councils are charged and, strangely enough, under the old régime, no such watchbody was necessary, for the Ministries were watchful up to a point, and the Press could publish paragraphs that had telling effects on some gas managers; in addition, the magic word 'competition' meant something that gave action. The gas industry was by no means perfect in 1948. It was very good in parts. What it will be like in 1950 none dares prognosticate. The new set-up, the new hierarchy, despite its Council, Boards and Consultative Councils, is a cumbersome machine which has to compete with a similar organisation selling electricity and, overall, the battle should be one of giants with the Ministry of Fuel and Power acting as referee; until the Government gives us a balanced fuel policy.

Meanwhile the referee between the Boards and their consumers takes the form of the Consultative Councils, of which we have not yet had any experience. Nearly all of these have been appointed now and consist to a large extent of city and county councillors. The size of the Councils, which consist of from 20 to 30 members, makes them unwieldy and they will have to be well handled by their chairmen if they are to produce useful reports and recommendations. Each chairman will hold a very important position as a liaison officer between Boards and consumers; each is a member of a Board and thus will be kept fully informed as to policy and developments, and the detailed working of the Board. Gas is not a simple industry. To understand it properly, one has to be a laudable combination of economist, engineer, chemist, accountant and salesman; it would be fair to say, for example, that there are not many people outside the industry who could explain the price build-up of a therm of gas. In these circumstances, it is suggested that each Council should commence its experimental life by visiting a gasworks and seeing and hearing something of the distribution and selling of gas. Only in this way will they realise how much machinery there is behind the gas tap, and it would be folly to place them in a committee room to discuss the local fate of an industry without knowing the rudiments thereof. A butcher would not be permitted to enter an operating theatre to excise someone's appendix, even under the present health scheme. In addition to the main Council, the Gas Act permits of the appointment of local committees who will consider local gas problems and make recommendations after deliberating. Here, it would seem, the local Mayor or Council Chairman could quite well make a single report and thus obviate the meeting of several people to discuss what might well be a simple matter. It must be agreed in these days that there are too many committees who talk and do little, and too few who talk little and do much. The energies of these Consultative Councils could be canalised into useful channels if the energies are directed to principles. The Act demands co-operation; let us therefore co-operate for the benefit of our consumers.

CONTRACTORS AND THE B.E.A.

THE British Electricity Authority, after two years of discussions, negotiations, and controversy within the nationalised industry, has now declared its belief that there should be no restrictions on the contracting activities of the area Boards. The statement which has been issued only puts into writing what has been carried out in practice by the Boards since the vesting date. More important, however, is the declaration that 'trading activities by the 14 area electricity Boards will be conducted on fair and unsubsidised commercial lines and on the basis of good relations with private electrical contractors.' Arising from this expression of good faith, it has been possible for the B.E.A. to arrive at an agreement with the Electrical Contractors' Association and the Electrical Contractors' Association of Scotland upon the definition of certain general principles to guide trading relationships of all electrical contractors, including the area Boards. This agreement bids fair to bring to an undramatic end the controversy between private contractors and the area Boards which has at times reached the proportions of a battle royal, with the more violent partisans of private contracting demanding the political wooing of the Opposition party in Parliament on their behalf. The bone of contention has been, of course, the alleged unfair competition in installation work which, it was maintained, arose from the activities of a number of the area Boards. The private contractors were well aware that competition in installation work by the electrical suppliers was no innovation; most companies and many municipal authorities had indulged in it prior to nationalisation. The contractor's fear was that what was once part of a patchwork might now become a general pattern. Their apprehensions were such as to revive after 10 years the annual conference of the Electrical Contractors' Association and to attract a record attendance.

In his Presidential address at the conference, Mr. J. G. Briggs repeated an earlier statement that prices were being quoted for installation work by the B.E.A. which were barely sufficient to cover the cost of labour and materials. Other evidence was forthcoming that members of the Association were unable to sell equipment for cash when uncommercial hire purchase terms were so freely and widely offered by the area Boards; it was further alleged that the supply authorities in some instances were refusing to accept a new customer from a private contractor without a personal interview, at which the customer was persuaded to have his work carried out by the authority. Such was the crux of the contractors' grievance. With the establishment of area Boards and their inheritance of contracting departments formerly operated by the municipalities and companies, the lot of the contractors was indeed a difficult one, and of a nature which warranted a wide measure of sympathy. Contractors, like everyone else, however, cannot live on kind thoughts, and

it was significant that a remark by the President at the conference calling for a working agreement between all the Boards and the B.E.A. in the interests of public service was warmly applauded. It was obvious that the negotiations which were then in progress would be brought quickly to a successful conclusion.

The fears of the contractor are now set at rest. The general principles which have been mutually laid down provide that in tendering and charging for contract work, all costs, including labour, materials, and overheads, will be assessed on a fair commercial basis, and that freedom of action is reserved to buy in the best market at the best possible terms, and to take deliveries at any desired place. Full list prices will be charged for retail sales, hire purchase terms and credit facilities will be based on sound economic and commercial lines, and inter-trading between electrical contractors, including the Boards, will be a matter for mutual arrangement *ad hoc*. With the exception of existing agreements, charges for hire of domestic apparatus of low current consumption or low initial cost will allow for all costs, including maintenance, except where this is charged for separately. That this is acceptable to the contractors seems evident from a comment by Mr. L. C. Penwill, Director and Secretary of the Electrical Contractors' Association: 'The E.C.A., whose members carry out 85% of the electrical installation and contracting work in the country, welcome the agreement. It should ensure, in an atmosphere of fair and healthy competition, the fullest co-operation between the electricity Boards and private contractors.'

As a final gesture of goodwill, there remains the possible adoption by the B.E.A. of a suggestion, advanced at the E.C.A. conference, that contractors should be represented on the industry's Consultative Councils. The terms of clause 7 (2) (b) of the Act seem to make this possible, for the members of the Councils are to represent various interests including 'other persons or organisations interested in the development of electricity in the area.' Such a concession would go far to ensure a complete burial of the hatchet.

THE SAFETY FACTOR

THE modern gas fire is efficient, economical, and pleasing in appearance, but according to a report of Dr. Leonard Colebrook and Vera Colebrook, published in *The Lancet* recently, there is room for improvement in the safety factor. The open coal fire is referred to as 'the outstanding hazard of the English home,' accounting for 300 deaths and 2,000 non-fatal injuries each year, and electric fires, particularly the light-weight portable variety, are more heavily castigated than gas fires. But the fact remains that unguarded gas fires accounted for 30 cases out of the 1,000 cases of home burns under review, only eight less than occurred with unguarded electric fires. The too-easy availability of gas cooker lighters to young children is also criticised, and the suggestion is made that they should be hung well above the cooker rather than at oven height. It may be thought that the figures relating to accidents in Birmingham (where this survey was made) are abnormally high, but during 1945-47, of the 12 boroughs with a population exceeding a quarter of a million, nine had a higher death-rate than Birmingham, some of them more than twice as high. And of all the 83 boroughs of England and Wales, only 19 had a lower death-rate than Birmingham. The annual accident-rate is estimated at 100,000 burns and scalds needing hospital treatment in England and Wales alone, and, in the words of the authors, '. . . we have little reason to congratulate ourselves on our efforts to prevent these accidents.' The review comments that not only are the old-established risks still in evidence (such as unguarded open fires and the use of highly inflammable fabrics for children's wear), but they have been joined by 'new perils . . . particularly the unguarded mobile electric fire and the panel gas or electric fire placed in the wall, unguarded, at precisely the height of a child's frock; and little or nothing has been done either to warn or to protect the public.'

The review suggests the introduction of safer methods of heating houses, such as 'by central and, perhaps, district heating and by the wider use of enclosed coal fires and convector types of electric fires.' We assume that the authors have in mind slow combustion stoves for central heating. Introduction of district heating would appear to be a remote possibility. No mention is made of modern coke grates or of convector gas heaters. The assertions made by these specialists must be faced, and it would appear that there is a need for some form of protective guard on certain gas fires. The degree to which this guard would impair the efficiency of the fire is a matter for the designer, but it need be only slight. The answer would appear to lie in the use of a wire screen, which provided the mesh was of such a thickness as to combine maximum durability with minimum loss of heat, would not spoil the appearance of the appliance. In any case, there would be compensation in the publicity which could be given to the safety of the fire.

Many readers will wish to enquire further into the findings of these two research workers. We would point out that the report is dealt with at some length in the September issue of *Gas Service*, and pertinent sections have been abstracted for comment.

JOHN BULL, SALESMAN

AT a time when our national economic stability rests upon maintaining and enlarging the volume of exports from this country, a demonstration of British inventive and manufacturing skill such as is offered by the Engineering and Marine Exhibition has a special significance. This remarkable show, currently reigning at Olympia, is in itself a refutation of those criticisms levelled at us by doubters of our recovery effort. It does not require a specialist's eye to appreciate that in this exhibition, now larger than ever before, is indisputable proof that Britain not only can make it, but can deliver the goods too. Can she *sell* them? If there is a flaw in our export effort, it surely lies in our sales methods and publicity enthusiasm. Productive efficiency may be the road to national recovery, but without salesmanship productive efficiency will not reach the goal. This was the gist of Sir John Anderson's remarks at the inaugural luncheon of the exhibition. It was not enough, he suggested, to stage a display of high quality engineering

goods of unsurpassed finish and craftsmanship; the world might be aware of this, 'but you must go on telling people —that is the essence of salesmanship.' Sir John made other points worthy of comment, among them the great advances achieved in metallurgy in the past two years. Thus, although an exhibit might appear to be identical with its 1947 counterpart, close enquiry might well reveal greater strength and endurance. Another remark, perhaps a little ambiguous in character, concerned the continuous advance in controls, and it is true that this exhibition emphasises very clearly the increasing use of devices for mechanical control, particularly in the field of electronics. Again, referring to our chances of success in world markets, Sir John said: 'We are fortunate in this country in having built up, with our great industries, a magnificent organisation of schools and technical colleges, universities and scientific and industrial libraries and laboratories. These things cannot be created in a day by a country which decides to compete with us industrially. I want to place on record my appreciation of the wisdom displayed by the engineering industry in developing and continuing to develop a system of apprenticeships and training for the industry which gives not only a superb start in a life's career to our young people, but attracts eager students from all over the world. That in itself is excellent forward salesmanship.'

It is clear that salesmanship was the keynote of discussion at this meeting, and is the subject receiving most attention in the sphere of British export trade. If, in recent years, British salesmanship has been under par, one can only wonder at the feats achieved without this faculty. Comparing 1938 figures with those of the year 1948-49 in respect of nine prominent trading countries of Europe, it is found that the proportion of exports by those countries to the dollar area has fallen in all cases, by percentages varying from 57% to 6%; whereas in the case of the United Kingdom, our proportion of imports from the dollar areas covered by our exports has increased by 9% in value. If the Engineering and Marine Exhibition (which is reviewed at length in later pages) serves as a starting point for an upward curve in British salesmanship, it will deserve a lasting place in our history. Perhaps it would be fitting to conclude with an apt definition: The main features of good engineering salesmanship are an unqualified technical knowledge of the products to be sold and the creation of an atmosphere of mutual trust between buyer and seller. And that is as worthy of consideration within the gas industry as in the larger sphere of world engineering commerce.

BALANCED FLUE HEATING

We have recently given prominence in our pages to what has come to be known as 'balanced flue heating.' We predict a considerable future for this method of applying gas to space heating. Modern methods of building construction embodying the many-storeyed type of dwelling will inevitably impose handicaps on gas appliances which need to be connected to a chimney flue. Balanced flue heating by gas provides an answer not only to this particular set of difficulties but to other problems when flueless heaters do not meet every requirement. Major experimental work on the balanced flue heater was undertaken in the laboratories of the South Metropolitan Gas Company, and the results of the investigation were given last year by Mr. G. H. Fuidge, chief physicist of the company, now chief physicist to the South Eastern Gas Board, in a paper to the London and Southern Junior Gas Association. The paper was published in full in the October, 1948, issue of *Gas*. At the time the heater described had not been produced commercially, but Mr. Fuidge was altogether modest in claiming that it would prove 'a useful addition to the space-heating appliances available to the gas industry.' The heater in question is now being marketed, is simple in construction, low in capital cost, and the maintenance required should be negligible.

THE TASK AHEAD

We have read and re-read with peculiar interest the address which Mr. T. Mervyn Jones, Chairman of the Wales Gas Board, gave at the Nalgo Summer School a few weeks ago, and of which we gave a summary in the *Journal* of Aug. 17. The author is one of the five area Board Chairmen to whom we referred at the time of their appointment as new-comers to the industry. In Mr. Mervyn Jones's case he came into the industry still young in years but ripe in distinguished local government service, having been Town Clerk of Newport for some years before he accepted Mr. Gaitskell's invitation to preside over the Wales Gas Board. No-one could have been better fitted to address a Nalgo gathering. Although Newport itself was served by a company gas undertaking, Mr. Mervyn Jones was no stranger to municipal gas administration, in which he was alive to the defects as well as to the advantages of that form of public ownership. There is more than passing significance, therefore, in what he had to say about the task ahead of the nationalised industry. Its greatest task, in his view, is to preserve and indeed to extend in each individual engaged in gas service in whatever capacity the sense of his or her personal stake in its future efficiency for the public weal. This service, like all others, will be as good or as bad as those engaged in it themselves determine. Mr. Mervyn Jones described as remarkable the sense of personal loyalty and devotion to duty shown by all those engaged in the gas industry over past years, and added: 'Our first and greatest task in my view is so to conduct ourselves in the responsibilities that are now ours as members of area Boards as to justify the continuance of this devotion and loyalty to the service albeit in its new form. 'We would,' he said, 'like to do very much more, and that is to give each a sense of personal partnership and participation in the new venture that lies ahead. Everywhere, Boards are adopting schemes designed to further the education and training of those now in, and those about to enter, the gas industry.'

SLOW PROGRESS

In his report for 1948, from which we gave extracts last week, Mr. W. A. Damon, Chief Inspector of Alkali, &c., Works, remarks that as in 1947 the rate of building of new works was slower than anticipated, though steady progress was made, and a substantial amount of reconstruction at existing works was undertaken. The desired repair and rebuilding of many coke ovens has been delayed, with the result that there has been a tendency to operate available batteries in excess of their rated capacity. When central carbonisation plants are erected in the North Eastern and East Midland Divisions, some form of apparatus for the reduction of smoke emission during charging will be provided. Turning to gasworks, Mr. Damon notes that in the past two years an increasing number of complaints have been made alleging the discharge of excessive smoke, soot, grit, and fumes. In every case they have had reference to the operation of horizontal retorts, the handling and screening of coke, the use of water gas plants, or steam raising. The Chief Inspector expresses the opinion that it is not possible to operate horizontal retort installations without the likelihood of giving some offence to residents in the immediate vicinity, but some mitigation can be secured by the use and skilled operation of suitable coal charging machines and methods of coke handling. Coke screening plant should, he says, normally be housed and grit arrestors should be provided for dealing with waste gas

from steam boilers and water gas plants. The report goes on to deal with a number of specific works, and there is throughout the chapter an insistence on the need for speeding up reconstruction and replacement of various items of plant.

RISING PRICES?

We have had occasion recently in these pages to comment on two controversies which have arisen from or have been attributed to the nationalisation of the gas industry—namely, the problem of compensation values under the Gas Act, and the increases in the price of gas announced by a number of area Boards. A northern correspondent has now called our attention to a third matter. This we feel may occasion a dispute which, although purely local in character, may have widespread repercussions and surpass other topics of current controversy in notoriety or even spleen. An evening paper, in advertising on August 27 the increased prices for a northern undertaking, listed the new rates, both domestic and non-domestic, in shillings per therm instead of pence. Thus the price of the first five therms per quarter was shown as 15s. 6d. per therm. We have no knowledge to date of any admission of error in or any correction to the notice; neither have we learned of any hostile demonstrations of indignant consumers outside the offices of the undertaking. Perhaps we shall hear from correspondents who will sign themselves 'Inflation.'

Letters to the Editor

THE HEMSWORTH COKE OVENS

DEAR SIR,—It has been brought to my notice that in my contribution to the discussion on the French report on providing for peak loads, submitted to the International Gas Conference on June 16, when referring to the Hemsworth coke ovens I might have given the impression that the plant was not an efficient unit of production. This, of course, is far from being the case, as the Hemsworth plant is one of the most efficient and economic units in the industry.

My observation was intended to convey what was my opinion, that such a plant—primarily designed for the most economic production of town gas supplies—should be owned and operated by the authority responsible for gas supplies.

Yours faithfully,
W. HODKINSON,
Chief Technical and Planning Officer.

North Western Gas Board, Bridgewater House,
60, Whitworth Street, Manchester, 1.
August 27, 1949.

COKE OVEN GAS PRICES

DEAR SIR,—Although I do not usually reply to anonymous correspondents, I cannot let the letter published over the signature 'Steel' (in your issue of Aug. 24) pass without challenge.

The burden of the speech to which he refers was a warning of the danger to the public interest if one nationalised industry should try to exploit another in order to start that very 'empire building' of which 'Steel' complains.

I did not refer to the price of coke oven gas, but such prices were vividly in my mind when I claimed—as I have consistently claimed for many years past—that coke ovens supplying gas for public supply should come under the control of the authorities responsible for public gas supply.

I have myself prepared most careful estimates based on the present capital cost of new plant, and the present market prices of coal and coke, on the basis of which it is clear that in most areas the valuation placed upon crude gas by 'Steel' cannot be justified.

If 'Steel' cares to reveal his identity to me, I shall be happy to disclose my estimates to him.

Yours faithfully,
W. M. CARR,
Chairman.

North Western Gas Board,
Bridgewater House, 60, Whitworth Street, Manchester, 1.
Sept. 2, 1949.

Personal

Mr. **J. O'Hara,** Senior Cost Accountant, Coventry District undertaking, has been appointed to the post of Chief Accountancy Assistant with the Warwickshire Division of the West Midlands Gas Board.

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Mr. **Norman Taylor,** who has been Personnel Manager for the Marshall organisation at Gainsborough, has been appointed Personnel and Establishment Officer to the West Midlands Gas Board.

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Mr. **L. S. Wright,** Production Engineer to the Stoke-on-Trent undertaking, has been promoted to the position of Assistant Engineer and Manager. He joined the undertaking in 1934 as Junior Chemist in the laboratory, and has occupied the posts of Assistant Chemist and Carbonising Superintendent. Mr. **Clark Barlow,** Assistant Production Engineer, has been appointed to succeed Mr. Wright as Production Engineer.

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Mr. **W. J. G. Bryce,** Deputy Engineer and Manager of the Spalding undertaking for the past 18 months, has taken up his post as Deputy Engineer and Manager at the Bilston undertaking of the West Midlands Board. On the occasion of his leaving Spalding he was presented with a pen and pencil set and wallet, the gift being made by Mr. R. C. Arnold, Engineer and Manager, on behalf of the staff and employees.

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Mr. **A. H. Edney,** D.A.A., has been appointed Advertising Manager by Ascot Gas Water Heaters, Ltd., and will be responsible for the administration and planning of all publicity activities for Ascot Gas Water Heaters, F.A. Neat Gas Appliances and Compoflex Gas Tubing. Mr. Edney is no newcomer to the gas industry; for several years before the war he held appointments in the publicity department of the British Commercial Gas Association and later joined Ascot's advertising department.

Mr. A. H. Edney

He rejoined Ascot's after six years in the Army, from which he was demobilised with the rank of Major. After a short interval in London, he took up his duties as Assistant Manager of the Company's Northern Area office in Manchester where he remained for three years until his return to London to take up his new appointment.

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Mr. **G. W. S. Cranmer,** Director and Secretary of the Willenhall undertaking, retired in January. Announcing this, the August issue of the magazine of the West Midlands Gas Board says that Mr. Cranmer, who is 78 years old, first became associated with the undertaking over 50 years ago, when he was clerk of works in charge of the erection of new works at Sandbeds, and he has been connected with the gas industry for 60 years. In 1894 he took up a similar position with the Wolverhampton Gas Company until the following year when he went to Exeter as Works Superintendent. He returned to Willenhall in 1897 as Engineer and Manager. He undertook the additional duties of Secretary in 1926, and was Managing Director for the last 10 years. When he retired from the position of Engineer five years ago, his son, Mr. **A. G. Cranmer,** succeeded him and now holds the three offices of Manager,

Engineer and Secretary. In his half century of service to the undertaking he has seen the output of the works grow steadily from 70 mill. to the present figure of 400 mill. cu.ft. He was President of the Midland Association of Gas Engineers and Managers in 1928, and several times served as a councillor for the Short Heath and Willenhall Districts. To mark the occasion of his retirement, Mr. Cranmer was presented with a writing bureau on behalf of the employees.

The Minister of Fuel and Power has made the following additional appointments to the Gas Consultative Council for Scotland:—Councillor W. CAMPBELL (Craigmillar, Edinburgh), Dr. (Mrs.) J. R. LANG (Bathgate, West Lothian), Mr. C. MULHOLLAND (Kirknewton, Midlothian).

Following the appointment of Alderman A. C. WARWICK, J.P. (East Dulwich) as Chairman of the South Eastern Gas Consultative Council, additional members of the Council have been chosen by the Minister of Fuel and Power as follows: Alderman Major F. W. BEECH, J.P. (Eltham), Mr. W. J. BOURNE (Dartford), Mrs. L. BRETT (Thornton Heath), Mr. L. E. BROUGHAM (Purley), Councillor A. B. CONSTABLE (Dover), Mr. W. EASTWICK (Sittingbourne), Councillor Mrs. C. GATES (Southwark), Dr. J. A. GILLISON (Rotherhithe), Alderman Rear Admiral J. H. HARRISON (Upper Norwood), Alderman J. M. JOHNSON (Twickenham), Lt. Col. Sir C. V. JONES, C.B.E. (Hythe), Councillor H. M. KENNY (Canterbury), Alderman E. S. W. LANGTON (Eltham), Alderman W. L. LORKIN, J.P. (Reigate), Councillor J. A. TREVELYAN LEAK, F.R.H.S. (Brighton), Mrs. E. MASON (Sidcup), Mr. A. C. MILLER (Hove), Mr. F. G. L. MOIR (Sanderstead), Mr. G. PAGETT (Chatham), Mrs. D. N. RATHBONE (Oxshot), Councillor P. G. WOOD (Eastbourne).

Obituary

Mr. **James Widdas,** former Manager of the by-product plant at Newton Cap, Co. Durham, has died at the age of 70. Trained as a civil engineer, he was associated with by-product plants in South-West Durham and South Wales over a long period.

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Mr. **A. A. N. Carpenter,** who retired from the Gas Light and Coke Company in 1940, died on Aug. 22, at the age of 74. Mr. Carpenter in the 90's was Assistant Engineer and Manager of the Great Yarmouth Gasworks and was appointed Assistant Engineer, Beckton, in 1899. In 1903 he went to Bromley Gasworks as Assistant Engineer and in 1906 was appointed Deputy Resident Engineer, Beckton, from which he transferred to Fulham as Assistant Engineer in 1911. After a short time he went to Bow Common Works, and later to Kensal Green, where he was Station Engineer until his retirement nine years ago.

1949 'Journal' Directory

In order to keep the Directory information up to date, the following alterations which have been notified during the past month should be noted in the 1949 issue of the *Gas Journal Calendar and Directory.*

Page 54.—NORTHAMPTON: Delete H. E. Banks *E, M & S,* retired.

„ 92.—HADDINGTON: Delete J. H. Fulton *E & M.*

„ 92.—KIRKCALDY: J. H. Fulton *E & M,* vice D. L. Dickson.

„ 92.—JOHNSTONE: D. W. Davison *E & M,* vice A. Jamieson.

„ 94.—NAIRN: Delete T. M'Dougall *E & M.*

„ 96.—PERTH: Delete A. R. Wilson *WM,* retired.

„ 177.—PUBLIC LIGHTING ENGINEERS, ASSOCIATION OF: Offices, 22, Surrey Street, Strand, London, W.C.2. T/N TEMple Bar 9607.

„ 177.—NATIONAL BENZOLE ASSOCIATION: President, Sir Edgar Sylvester, K.B.E.; Secretary, W. E. Cartwright.

Diary

Sept. 8-9.—**Combustion Engineering Association:** Conference on the Rational Allocation of Coal, Palace Hotel, Buxton.

Sept. 8.—**Institute of Welding:** Visit to the Engineering and Marine Exhibition, Olympia.

Sept. 12-16.—**Association of Public Lighting Engineers:** Annual Meeting, Llandudno.

Sept. 12.—**Women's Gas Council:** Executive Committee, Gas Industry House, 1 p.m.

Sept. 13.—**Women's Gas Council:** Headquarters Members. Visit to the Cavendish Works (De La Rue). Leaving Gas Industry House, 2 p.m.

Sept. 15.—**North British Association:** Annual General Meeting, Music Hall, George Street, Edinburgh.

Sept. 24.—**Eastern Junior Gas Association:** Meeting at Norwich. Presidential Address by J. T. Brookes.

Sept. 28-29.—**Wales and Monmouthshire Association of Gas Engineers and Managers:** Annual Meeting, Cardiff. (Golf competition at Radyr Golf Club on Sept. 28; annual meeting at Engineers' Institute, Park Place, Cardiff, on Sept. 29, followed by visit to steel works of Guest Keen and Baldwins).

Sept. 29.—**Midland Association of Gas Engineers and Managers:** Visit to the works of the Midland Tar Distilleries, Ltd., Oldbury.

Oct. 19.—**Society of British Gas Industries Golf Circle:** Autumn Meeting, Fulwell Golf Club, Hampton Hill, Middlesex.

Oct. 25.—**Institute of Welding:** Presidential Address of O. V. S. Bulleid, C.B.E., M.I.MECH.E. Institution of Structural Engineers, 11, Upper Belgrave Street, London, S.W.1.

New Chemical Dictionary

A second edition of 'A New Dictionary of Chemistry,' edited by the late Dr. Stephen Miall, LL.D., B.SC., and Mr. Mackenzie Miall, B.A., F.R.I.C., with the assistance of many well-known chemists, has been published by Longmans, Green and Co., price 60s. net. The first edition was published in 1940, but almost all the existing stocks were destroyed in a raid on London at the end of that year. War-time difficulties precluded a reprint of the first edition, and the opportunity has now been taken to improve the work by bringing it up to date. This dictionary is comprised in a handy volume of 580 pages, into which has been compressed a remarkable amount of information. It contains not only a brief explanation of the meaning of terms used in chemistry and chemical engineering, but also brief accounts of many chemical substances, chemical operations, drugs, vitamins, and other bodies of biochemical importance. There is also included a roll of notable chemists of the present and past generations.

The size of the edition has been retained as far as possible on the lines of the first edition, and for that reason certain of the articles in the original dictionary have been condensed or in some cases deleted to make room for information of more recent importance—for example, on atomic energy and on the sulphanomide group of drugs. This dictionary will be useful not only to chemists but to a much wider circle of people who require occasional information and accurate references on chemical matters.

The Mechanical Handling Exhibition, first held in London in July, 1948, is to be repeated at Olympia, London, from June 6 to 17, 1950. The exhibition will be larger than the first one, and its run of 11 days instead of nine has been arranged to include two Saturdays to encourage visits by factory managers, foremen and operatives.

HARLOW NEW TOWN

THE new town of Harlow has been designed to house 60,000 people, though proposals have been made for increasing the population eventually to 80,000. The site adjoins the present town of Harlow and extends in an easterly and southerly direction. It lies entirely on the south bank of the River Stort. It is served by the Eastern section of British Railways from Liverpool Street and we understand that additional rail tracks will be laid to give an improved service to London.

Approximately 100 houses are now under construction and should be completed this year. These will house key workers. The present programme includes some 600 houses in 1950. After this it is anticipated that the building rate may be stepped up to about 1,000 houses per annum.

The present town of Harlow is supplied with gas from the Bishops Stortford works of the Tottenham Division of the Eastern Gas Board, which is about six miles distant. This works has a gas-making capacity of a little over 1 mill. cu.ft. per diem and will not therefore be able to supply the new town, the final demand from which is estimated to reach a maximum of about 3 mill. cu.ft. per diem. Arrangements have therefore been made to establish a gasholder station at Harlow and to give supply through a 12 in. high pressure main, some seven miles in length, which will be laid during the next few months. This will connect Harlow to the high pressure system already in existence which delivers gas from the new works at Ponders End to Waltham, Hoddesdon, and other areas in the Lea valley. In this way a link will be made between the systems of the old Tottenham and Bishops Stortford Companies and gas from Ponders End will supply not only the new town of Harlow but also areas already supplied from Bishops Stortford.

It is proposed to erect a gasholder of 1 mill. cu.ft. capacity at Harlow. This should be completed in about two years' time. Another holder of equal capacity will be erected later as development proceeds. Gas will be supplied in the new town upon the same terms as apply in the old Tottenham Company's area of the Tottenham Division, and gas will be placed on a fair competitive basis with electricity. Results of this competition in the new town have yet to be seen.

The Harlow Development Corporation is interested in the supply of coke to premises in the new town as they wish to encourage the consumption of smokeless fuel. The Tottenham Division has offered to give house to house delivery of graded coke upon the same terms that apply elsewhere. The Development Corporation hopes to attract a considerable number of suitable industries to the new town. A supply of gas for these industries, together with the Tottenham Division's industrial advisory service, will, of course, be available for the benefit of all new factories.

Coke in U.S.A.

Production of coke from coal gas retorts in the United States in 1948 decreased 20% from 1947 and totalled 529,374 net tons, according to reports received from producers by the Bureau of Mines, United States Department of the Interior. The manufacture of retort coke has been declining steadily in recent years because of the substitution of water gas, natural gas, or liquefied petroleum gases for coal gas.

In 1942 there were 96 coal gas plants in operation which produced 892,552 tons of coke, while in 1948 only 36 plants reported production. Thus, in the past six years 60 coal gas plants have discontinued operations. 1,530 retorts have been abandoned, and annual coal carbonisation capacity of the industry has been lowered by 881,500 tons. Horizontal retorts, which were the predominant type of carbonising equipment used in the early days of the coal gas industry in the United States, have been dropping out of production at a more rapid rate than the vertical or semi-inclined type which were introduced later. At the end of 1942 there were 1.881 horizontal retorts in operation and they produced 41% of the total output of retort coke, while at the end of 1948, 543 horizontal retorts were reported in operation, accounting for only 31% of the national output.

The sharp reduction in number of active coal gas plants in 1948 naturally lowered coal requirements and the total quantity carbonised in 1948 declined 18% from the 1947 figure. However, increases in mining and transportation costs raised the cost of coal delivered to the gas utilities and the average value per ton increased 24% over 1947 and was 72% higher than the 1943 average. The yield of coke per ton of coal charged declined slightly in 1948 which indicates that the quality of coking coal available was possibly poorer.

The Clyde Valley Scheme, now issued in a massive report by the Stationery Office, involves major alterations in the system of life in the area. From the viewpoint of the gas industry the main interest lies in the proposals to form new communities and to expand existing smaller communities outside Glasgow, which is regarded as the core of the planning problem. The fact that four new towns are proposed, at Cumbernaule, East Kilbride, Bishopton and Houston, each of some 60,000 inhabitants to take an overspill of 300,000 away from Glasgow, shows the implications of only one part of the report.

The Institute of Gas Technology is constructing a new building in Chicago to house its rapidly expanding facilities for gas industry research and education necessitated by the current expansion programme of the gas industry. The building will house the Institute's precision laboratories, some of its research laboratories, its educational facilities, information service, library and administrative and business offices. Consisting of two stories and a full basement, the reinforced-concrete structure will occupy a space 168 ft. by 72 ft. in a 70,000 sq. ft. plot, the remainder of which is reserved for future expansion. Total cost of the Institute's new quarters, including fittings, landscaping, and architectural fees, will be approximately $600,000.

The Following District Offices of the Board of Trade (London and South East Region) have been closed : 3, Pierrepont Road, Acton, W.3 ; 1, Banstead Road, Purley ; 20, Court Road, Eltham, S.E.9.

Dundee Corporation Factorial Committee was informed last week that replacement of the pre-war type of black gas cookers in the city's housing schemes would mean 7,000 new cookers at £17 each. Mr. W. S. Johnston, Manager of the Dundee group of undertakings under the Scottish Gas Board, wrote that the black type was no longer available and that all-enamel cookers were now being supplied in new housing schemes. In order that tenants should feel there was no unfairness in the method of replacement, he suggested that the Corporation should adopt a policy of methodical replacement according to the date of first installation, and at a stated number per annum. The matter was remitted to a sub-committee for consideration.

At the Inaugural Meeting of the East Midlands Gas Consultative Council, held at Nottingham Guildhall on Aug. 24, the recently announced increase in the price of gas for Nottingham was approved. Four area committees are to be set up comprising between seven and nine members. Members of the Consultative Council will be represented on these committees as follows : Nottinghamshire and Derbyshire area : Alderman W. SHARP, former Chairman of Nottingham Gas Committee, Councillor H. C. MARTIN (Chesterfield) and Miss F. BONAS (Derby). Lincolnshire area : Councillor E. S. EVERITT (Lincoln), Captain J. F. RICHARDSON (Spilsby), Alderman B. H. SINDHALL (Grantham), and Councillor W. ALBANS (Scunthorpe).

Figures Issued by the Ministry of Fuel show a drop in coal production from 4 mill. tons for the week ended Aug. 20 to 3,771,400 tons for the week ended Aug. 27, making a total loss of 288,600 tons. Losses of 261,200 tons in South Yorkshire and 62,600 tons in Lancashire and Cheshire are shown as a direct result of the pit winder's strike in those areas. The decline in manpower continues with a drop from 719,400 for the week ended Aug. 13 to 718,600 for the week ended Aug. 20, giving a total loss of 800 of which 100 were face workers. Gas production for the week ended Aug. 26 amounted to 8,520 mill. cu.ft. as compared with 8,554 mill. cu.ft. in the previous week. Electricity supplies, however, continue to rise with an increase of 7 mill. units for the week ended Aug. 26 over the previous week.

New Specifications

THE signing of a Declaration of Accord between Great Britain, the U.S.A. and Canada regarding an agreement between these three countries on a unified screw thread system was reported last December. Final technical details have since been completed in the preparation of the national standards. The British and the American Standards have recently been published, and the Canadian Standard is to be expected shortly.

The system at present relates to threads ¼ in. and larger for bolts, nuts, screws and engineering details; no common agreement has yet been reached regarding threads smaller than ¼ in. or pipe threads. The system embraces a defined thread form, two regular diameter/pitch series, namely, a coarse series and a fine series, and the appropriate tolerances for three classes of threads in the regular series and also for threads of special diameters and pitches. The form of thread is one having a 60° angle. The bolt (external) thread has a rounded root with the alternatives of a rounded crest for use in the United Kingdom and a flat crest for use in the U.S.A. The nut (internal) thread follows conventional practice in having a cleared minor diameter to facilitate tapping.

The newly issued British Standard 1580 furnishes all the technical data necessary to ensure the interchangeability of threaded products made to this standard and to the corresponding American and Canadian standards. The standard includes recommendations as to the types and thread forms of gauges for inspecting the unified thread. For the convenience of users in countries in which the metric system of measurement has been generally adopted, the metric equivalents of all of the tables of dimensions and tolerances are given in an appendix.

The Standards organisations in the three countries concerned will maintain continuous co-operation for the development and extension of the standard. Discussions are already proceeding in Great Britain on the question of a unified thread system for sizes below ¼ in. and on the general dimensions of bolts and nuts with the unified thread.

The present specification is issued as a provisional British Standard. It is intended that, at the end of six months, it shall be reviewed in order that it may be confirmed as one of the series of British Standards for screw threads.

Bevel Gears

The 1949 edition of B.S. 545, Bevel Gears, which has just been published by the British Standards Institution, represents a complete revision of its predecessor and is the result of an exceptional amount of painstaking work by the committee responsible for it. The previous edition contains certain features that have lasted from a time when few were disposed to question them, only to be discarded in an age when critics are numerous, knowledgeable and indifferent to tradition.

The definitions have been revised with exceptional diligence and the aim has been to combine rigour and brevity without pedantic wording, but it is too much to hope that no purist will find any fault in them. The overlap ratio of helical bevel gear teeth comes into prominence because it is now rightly used in assessing load capacity. The basic tooth form is defined more accurately than heretofore and the method of determining appropriate addendum modification covers every case likely to occur in normal practice.

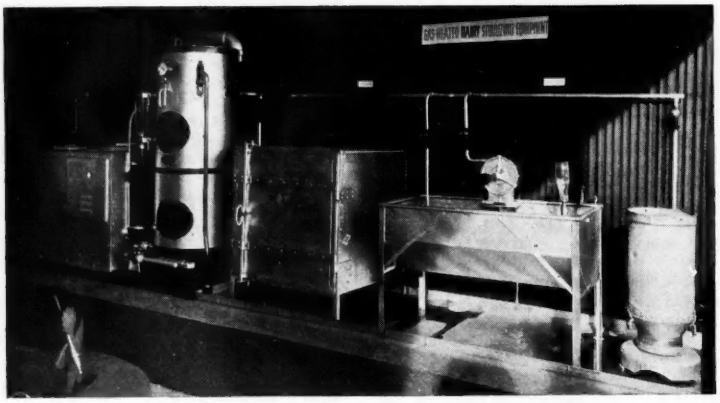
Inconsistencies in the previous formulæ for tolerance on pitch are avoided in the simpler ones that now replace them and the new expressions for load capacity include important factors that were ignored or inadequately represented in the 1934 edition of this standard. As before, there are a number of typical calculations of load capacity worked out in detail and the factors used in them are determined from charts that have been re-drawn to improve accuracy and ease of reading. In such calculations a 'life factor' is now used to take into account the length of life expected from the gears.

Copies of both Standards may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1 (7s. 6d., post free).

BUTANE GAS IN SCOTLAND

Development of the butane gas industry in Scotland on an expanding scale is promised in the current development at Grangemouth where the Anglo-Iranian Oil Co., Ltd., and Scottish Oils, Ltd., are engaged on a large-scale refinery development. When this is completed the existing output of butane, like that of other products derived from the refinery, will be considerably expanded ensuring an increased flow for users throughout rural Scotland. According to the companies the extension at Grangemouth will, when completed, give an annual throughput of 1,500,000 tons of crude oil per annum as against the former 600,000 tons, with an appropriate increase in the volume of individual products. The number of employees will also be expanded beyond the 4,500 at present working for Scottish Oils, Ltd., which has a very considerable share in British native production in the shale oil sphere. Among the products derived from crude oil and shale at Grangemouth and at the Lothian centres are coke, diesel oil, naphtha, motor spirit, sulphate of ammonia, butane, kerosine, vaporising oil, and gas oil. The excavation work now proceeding at Grangemouth to house the new plant was recently inspected by the Secretary of State for Scotland and impressed him as one of the most interesting and important of Scottish industrial projects ever attempted. Adjoining the new Anglo-Iranian site is an extension site for British Petroleum Chemicals, Ltd., a joint Anglo-Iranian and Distillers Co., Ltd., project which will draw some of its base stock from the new Grangemouth plant.

Gas supplies for East Kilbride, the new town now in process of creation in Lanarkshire, will be drawn from the County and will add to the existing heavy development programme which Lanarkshire has on hand. A feature of this area will be the location of the Department of Scientific and Industrial Research Station in the town. This will have a centre devoted to the testing and development of fuel appliances, a fact which alone makes the gas supply of vital importance since gas appliances will be among those tested. The station will also undertake a big programme of research work on mechanical properties of metals, on lubrication, road materials and making, and many other mechanical engineering projects. There are also plans for an industrial estate to use industrial gas on a considerable scale.



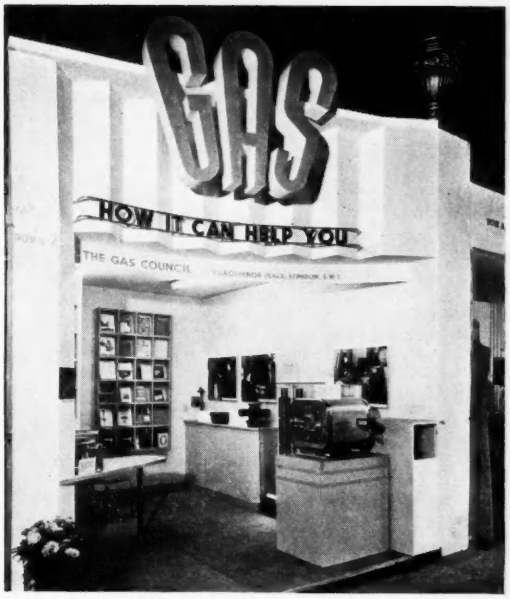
Our photograph shows a gas-heated dairy sterilising unit recently exhibited at the Great Yorkshire Show, Wakefield, by the North Eastern Gas Board.

Engineering at Olympia

UNTIL Sept. 10 Olympia will house the Engineering and Marine Exhibition. This highly personable and individual display of British engineering prowess, which commenced on Aug. 25, covers an astonishingly wide field of products; it is further widened by the inclusion of the Welding Exhibition, an entire section devoted to the most modern developments in this rapidly growing industry.

The Engineering and Marine Exhibition is old established, the first in the series being held in 1906, since when it has appeared every alternate autumn, with the exception of the war periods. The 1949 event, the sixteenth in the series, occupies for the first time all three Olympia buildings, and is thus the largest event of its kind in the world. In atmosphere it is vastly different to the British Industries Fair, the only comparable show in this country. There is a compactness and unity at Olympia impossible in the echoing vastness of Castle Bromwich. General arrangements and information services are beyond criticism.

Some impression of the size of the exhibition can be gained from the fact that there are in the region of 500 exhibitors, many of whom have taken areas of considerable size. Before dealing with a selection of trade stands, mention must be made of the **Gas Council** exhibit. This is primarily an information bureau and occupies a somewhat secluded position in a corner of the Grand Hall (Stand A2); however, its close proximity to the Pillar Hall Restaurant may have a significant bearing upon enquiries. It is comparatively small, is decorated in pleasing pastel shades, and is manned by skilled technicians. In addition to a stock of literature on all aspects of the use of gas in industry, and a pictorial exhibit illustrating such processes as forging, steel cutting by oxy-coal-gas, and various forms of heat treatment, there are a few exhibits.



The Gas Council Stand

Chief among these is a gas-fired muffle furnace (Selas Gas and Engineering Co., Ltd.), which is used for heating materials in an oxidising atmosphere. This model is designed for use at temperatures up to 1,000° C. The size of furnace shown is largely used for experimental and laboratory work, such as in the testing of heat resisting steels. Also shown is a model of a gas-fired lip axis tilting furnace, and an auto-gyro rotor head, the latter being a sample of the products of gas-fired forging and heat treatment. Two sample broaches made by the Lapointe Machine Tool Co., Ltd., by their gas-fired high speed steel-hardening equipment, are also included.

TOWARDS FUEL EFFICIENCY

An excellent example of stand design is offered by the **Department of Scientific and Industrial Research,** which demonstates some of the work being undertaken at the **Fuel Research Station.** Among the exhibits is a working model vortex chamber in which centrifugal forces are used to counteract the drag of the air which normally limits the rate of burning of powdered coal. The airborne, powdered coal is introduced into a whirlpool chamber in which the solid particles revolve in circular paths, while the air moves spirally past them towards the centre. By this means heat release at the rate of 500,000 B.Th.U. per cu.ft. per hour can be obtained, compared with 20,000 to 40,000 in the combustion chambers of large water-tube boilers. Also illustrated is the fluidised bed.

The following is a list of trade stands of interest to the gas industry. The list is necessarily incomplete, but within the limits of the space available, it is thought to offer a guide to the late visitor.

TRADE STANDS

The first stand of Row S in the National Hall is devoted to the products of the **Accurate Recording Instrument Company.** The range is extremely wide and comprises such equipment as dial thermometers, temperature indicators and controllers, temperature recorders, pressure gauges, pressure recorders, pressure switches, tank gauges, liquid level gauges, vacuum gauges, vacuum recorders, compound gauges, and differential gauges (pressure and temperate). The stand is attractive and the exhibits well displayed.

On Stand 44, in the Grand Hall gallery, is an exhibit by **Albright & Wilson, Ltd.** The stand, admirably designed by Hugh Casson, A.R.I.B.A., is divided into two parts, showing on one side displays of water treatment, and on the other, of some of the many products which incorporate Silicone derivatives. Sodium phosphates and sodium metaphosphate (Calgon) are used in the treatment of boiler feed and cooling water to prevent scale formation and corrosion. Among its many other uses Calgon has applications in the paper making and textile industries, in cheese melting, and in the manufacture of detergents. Among the versatile Silicone products now commercially available are: Fluids for damping and hydraulic systems; compounds for heat-stable water repellent insulating materials used in sealing high tension ignition systems and high frequency equipment, and for use as mould release agents and foam inhibitors; greases as special lubricants for valves and bearings operating at exceptionally high and low temperatures; resins and varnishes which are heat-resistant and waterproof; and Silastic rubber which remains serviceable over a very wide temperature range.

Also in the Grand Hall, but at Stand 4, Row D, on the ground floor, the **Automotive Products Co., Ltd.,** effectively displays a complete range of Lockheed industrial hydraulic equipment. Prominent among this is an hydraulically-operated controller with the necessary control valve and slave cylinders, which have capacities up to five tons thrust and are thus suitable for sequence operation of valves and other mechanisms, such as coke discharges from retorts and similar cyclic operations. Also shown on this attractive island stand is the well-known fan and boiler damper operating equipment, including hydraulic Servo equipment.

AN OUTSTANDING DISPLAY

Perhaps the most impressive stand in the whole exhibition is the huge display of the **British Aluminium Co., Ltd.** Here the accent is upon 'marine interest,' for the principal part of the exhibit consists of a funnel casing for T.S.S. 'Brighton,' while a series of handsome panels show the possibility of employing aluminium alloys in superstructures on various craft. The exhibits include a new form of treadplate, and the application of medium and high strength aluminium plate to large scale engineering and structural engineering projects is particularly emphasised. The stand is to be found on the ground floor of the Empire Hall, Row W, Stand 1.

Decorated in green and yellow, the exhibit of the **British Ermeto Corpora-**

tion, Ltd., consists of about 500 different types of Ermeto high pressure pipe couplings, designed to suit all kinds of metallic tubing, including copper, steel, stainless steel, aluminium, brass, bundy, &c. These fittings represent only a very small portion of the many thousands of different pipe fittings which can be supplied. The simple technique of making an Ermeto joint is explained and demonstrated, whilst its pressure holding qualities are given practical expression by the use of a small pump capable of sustaining pressures up to 15,000 lb. per sq. in. There is a display of photographs showing industrial applications of Ermeto fittings. The stand is numbered 51 in the Grand Hall gallery.

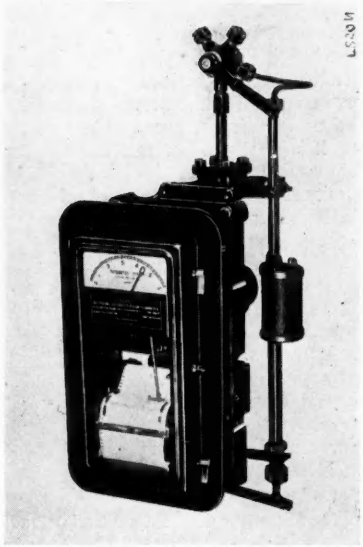
ELECTRONIC MOTOR CONTROL

On the ground floor of the National Hall, at Stand 5, the **British Thomson-Houston Co., Ltd.,** has a large exhibit of mainly 'marine interest.' There are, however, such features as a working demonstration of 'Emotrol' (electronic motor control), in which the equipment, using thyratrons for controlling the speed of a D.C. motor, provides automatic speed regulation to within + or − 2% over a wide speed range, current limit control, acceleration at constant current, and dynamic braking. The unit operates on A.C. mains, and no rotating machinery other than the motor is required. Another working exhibit is a thrustor operating a workshop crane brake mechanism suitable for a motor of about 60 h.p. The standard oil tank is replaced by one made of 'Perspex' so that visitors can see the simple but effective operation of a B.T-H. thrustor under actual working conditions.

A smart blue and white check floor sets the style for the stand of **Broom and Wade, Ltd.,** which presents an impressive range of pumps and compressors. For example, there is the S.V.D.1 portable diesel driven sleeve valve air compressor which achieves 110 cu.ft. F.A.D. per minute at 100 lb. pressure. An E.H.220 self-contained electrically-driven semi-portable air compressor set provides the air for pneumatic tool demonstrations. Also shown are small air- and water-cooled single and two-stage compressors, capacities up to 30 cu.ft. per minute and pressures up to 450 lb. Among the pneumatic tools for mechanical and civil engineering duties are an air winch, air hoist, and a sectioned patent crankless air motor. This is Stand 12 of Row B on the ground floor of the Grand Hall.

The **Chesterfield Tube Co., Ltd.,** has a stand (No. 6, Row H, Grand Hall, ground floor) with a distinctly nautical air. Stairs wind up to a circular office with porthole windows above the main exhibit. This consists of seamless steel water and steam drums up to and including 990 mm. internal diameter, seamless steel air/hydraulic accumulator bottles, cold drawn seamless steel steam pipes, solid drawn headers for boilers, superheaters and economisers, &c. The stand therefore deserves credit for unusual design, assisted by pleasant red lettering on a cream ground.

The **Consolidated Pneumatic Tool Co., Ltd.,** on Stand 4, Row W, on the ground floor, Empire Hall, has a display which covers two main ranges of equipment; Firstly, portable and stationary air compressors, and all sizes of pneumatic drills, grinders, wrenches, hammers, holders-on, chippers and scalers, with sump pumps and other pneumatic tools; and secondly, electric tools of the hicycle and universal types, ranging from small to large size drills and grinders. In addition, a range of Duff Norton jacks is shown. All these exhibits include types of portable tools of special interest to the shipbuilding industry, and there is an interesting display of sectional models illustrating precision workmanship. The stand, which has an imitation wood finish, is decorated with well mounted photographs of certain of these products in operation.



The above illustration shows an indicating integrating and recording flowmeter of the mercury manometer type, exhibited by Elliott Brothers (London), Ltd.

One of the largest exhibits in the whole show is that of **Crossley Brothers, Ltd.** (Stand 13, Row G, ground floor, Grand Hall, and Stand 4, Row U, ground floor, Empire Hall). This exhibit comprises heavy duty scavenge pump diesel engines typical of the Company's range—for marine propulsion and rail traction.

These engines, which are finished in a pleasant uniform grey, are thoroughly modern, compact, and attain high outputs, yet retain the simplicity of the type from which they have been developed—loop scavenge with port control.

Those shown include Type CRL.8, 8 cylinders, marine propulsion, 1,200 b.h.p. at 250 r.p.m. to 1,500 b.h.p. at 320 r.p.m.; Type HRTVee.12, 12 cylinders, for high-powered main line locomotives, 1,800 b.h.p. maximum rating at 600 r.p.m.; Type HRL.6, 6 cylinders, marine propulsion, 400 b.h.p. at 300 r.p.m. to 600 b.h.p. at 500 r.p.m.; Type ERL.6, 6 cylinders, marine propulsion, 180 b.h.p. at 450 r.p.m. to 300 b.h.p. at 750 r.p.m. Those engines not running are rotated slowly by concealed electric motors; Perspex inspection doors and interior lighting assist examination.

Making effective use of glass bricks, the cream stand of **Dewrance & Co., Ltd.,** shows a representative selection of high temperature boiler mountings and piping valves, including a demonstration model of a power-operated parallel slide valve. Safety valves, including Dewrance consolidated safety valves of the high lift and full lift types, are featured, together with remote liquid level indicators, impulse steam traps, and forged steel valves of various types for pressure ranges up to 2,000 lb. per sq.in. There is also an interesting model of a patent bi-colour illuminated water level indicator. This is Stand 11, Row H, ground floor, Grand Hall.

Stand 21 in the National Hall gallery is occupied by **Elliott Brothers (London), Ltd.** The principal part of the exhibit consists of five instrument panels. The first shows the Elliottronic potentiometer recorder, a continuous type high speed recorder (3 sec. across chart) which is remarkable for its great simplicity. It consists of interchangeable sub-assemblies which facilitate servicing.

The same panel shows also the Elliott pneumatic control system in which the various control elements can be accommodated in the recorder casing or else situated in the plant where convenient. The second panel shows indicating and recording flowmeters of the ring balance or manometer type; the third, electrical measuring instruments; the fourth, CO and $CO + H_2$ indicators and multicolour recorder; and the fifth, humidity and temperature indicators and multicolour recorder.

NEW CONTROL APPARATUS

Evershed electro-pneumatic process controls are a feature of the **Evershed & Vignoles, Ltd.,** stand. This is Stand 6, Row Q, on the ground floor of the National Hall. A simple pilot plant is installed to demonstrate the Company's recent development of this class of process control apparatus. Instruments on view include: A new high pressure stainless steel flow meter, a new design of displacer type liquid level transmitter, the Evershed electro-pneumatic valve positioner, a precise level controller (or automatic dipstick) and three-term electric controllers (for proportional, integral and derivative control). The demonstration also incorporates as part of the above items a number of recorders of a new circular disc type which are being shown for the first time.

Other apparatus shown includes a gas holder stock indicator and recorder, an electronic repeater (Wattmeter pattern), as used for the remote indication, recording and summation of electrical power, and a new range of Megger insulation, earth, and resistance testing instruments. The stand is quite attractive with a colour scheme of terra cotta lettering on cream.

A new oxygen cutting machine is the highspot on Stand 18 of Row E on the ground floor of the Grand Hall, where **Hancock & Co. (Engineers), Ltd.,** display their products. In this machine, the new drive is electronically controlled. It projects a pin-head of light onto the line of a drawing and this compels the tracer wheel to turn in such a manner that the spot of light will always remain on the line, thus ensuring the highest degree of accuracy. And, another remarkable feature is that the tracer wheel does not touch the drawing. Also shown are various other types of oxygen cutting and profiling machines, the majority of them working, and a selection of equipment for gas welding and cutting.

G. A. Harvey & Co. (London), Ltd. (Stand 8, Row M, ground floor, National Hall), exhibit an astonishingly wide range of sheet metal and steel platework, steel furniture, perforated metals, and woven

wire gauze. The latter, which is well known under the name of Harco wire cloth, is manufactured in all meshes and gauges and in all metals. Of special interest are the Harco special quality wire screens used for vibrators. These screens give a far longer life in service under the most exacting conditions than ordinary mild steel. The extensive range of perforated metals exhibited are of particular interest, and they demonstrate the innumerable patterns needed for all kinds of sifting, filtering and grading such diverse materials as coal, stone, cereals, food products, chemicals, &c. A feature of the stand is the selection of fine photographs mounted on chrome tubular frames.

TUBE BENDING PLANT

Hilmor, Ltd., exhibit a comprehensive range of tube bending machinery, which includes bench fixture and light weight portable models for the plumber, electrician and gas fitter, hand and power operated general purpose benders, and hand and power operated mandrel machines for the production of uniformly accurate full bore bends on short radii. The mandrel machines will be of particular interest to manufacturers of tubular furniture, cycle components, aircraft accessories, &c., and to all manufacturers concerned with the production on a repetition basis of precision made bends. Many of the 30 models comprising the Hilmor range have been redesigned to incorporate the most modern features in tube bending technique and several new models are introduced for the first time at this exhibition. The stand is numbered 11 in Row K, on the ground floor of the Grand Hall.

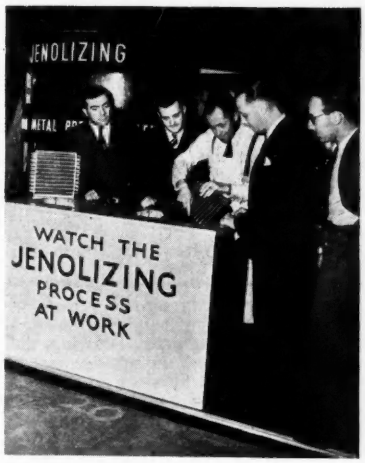
One can always rely upon an attractive exhibit from **Imperial Chemical Industries, Ltd.,** and their display at this exhibition is well in keeping with their general high standard. The Metals Division makes the maximum use of the variety of metals shown, of which the following are typical: Sheet, strip, tubes and extrusions in copper and copper base alloys and aluminium alloys; wire in copper, brass, phosphor-bronze and nickel silver; condenser tubes and ferrules in cupro nickel, Admiralty-brass, corrosion - resistant copper - nickel - iron tubes for sea water trunking, supply piping, &c.; scaffold tubes and extrusions for building purposes and checker plates for engine room and industrial workshop flooring in aluminium alloy; copper tubes to B.S.S. 659/1944 and Fyffe's fittings to B.S.S. 864/1945 for gas and water installations; Kuterlon long length copper tubes to B.S.S. 1386/47 for underground services. This is Stand 8 in the National Hall gallery.

The **Incandescent Group,** which occupies Stand 2, Row S, on the ground floor of the National Hall, comprises The Incandescent Heat Company, Ltd., Metalectric Furnaces, Ltd., Controlled Heat and Air, Ltd., Selas Gas and Engineering Co., Ltd., and Metal Porcelains, Ltd.

A complete range of photographs is shown, illustrated by the use of models, covering metallurgical furnaces and ancillary equipment for all industries, fired by solid fuel, gas, oil and electricity. The range includes complete vitreous enamelling, bright brazing and annealing, galvanising, normalising, hardening and tempering, gas carburising and malleableising plants. Complete mechanised sheet and strip rolling mill equipment and foundry equipment are included, together with arc melting furnaces, continuous and static drying ovens for all processes, including tin-printing, core and paint drying, gas and oil burners and valves, air-gas mixing apparatus, aluminium melting furnaces, and laboratory heating equipment.

The photographs are mounted on a moving belt, which combined with the blue and cream colour scheme to produce an attractive exhibit.

At Stand 20, Row GG, on the first floor of the Empire Hall, will be found a demonstration of the products of **Jenolite, Ltd.** This rust remover and neutraliser is demonstrated in two ways—by brushing or swabbing with a paint



A demonstration of Jenolite R.R.N. in progress at the exhibition

brush or rag, or by immersion in a diluted bath. The stand is very smart, being decorated with alternative horizontal stripes of black and chrome.

The old saying about not seeing the wood for the trees almost applies to the stand of **Keith-Blackman, Ltd.** (Stand 11, Row P. ground floor, National Hall), for this comparatively small stand houses a remarkable quantity of material. Most of the exhibits are of interest to the gas industry, and they include all types of fans and blowers, the latter having a pressure lift of ¼ to 5 lb. per sq. in. Gas boosting, valve cooling, providing air service to producers, cupolas and hearths, and supercharging diesel engines are but a few of the tasks undertaken by the Keith-Blackman products on show.

The two island stands of **Lancashire Dynamo & Crypto, Ltd.,** are 'bridged,' and include examples of the products of the Company's three principal works—Trafford Park, Willesden, and Cardiff. Electric motors suitable for use in gasworks are, of course, a speciality of this firm, and these embrace such features as dust-tight construction, ribbed carcase, and mica insulation. An interesting working exhibit is a D.C. motor which has given 50 years continuous service. The stands are numbered 6 and 7 and are to be found on the ground floor of the Empire Hall.

A colour scheme of black and white marks Stand 7 of Row J on the ground floor of the Grand Hall, on which are exhibited the products of **Megator Pumps and Compressors, Ltd.** Here, for the first time at any exhibition, the Megator air compressor is shown. This compressor, which is of similar construction to the well-known Megator pump for liquids, delivers compressed air that is cool, clean and free from oil. It is of extremely simple and durable construction and is lubricated entirely with water. The Megator air displacement pump, which incorporates this compressor, will deal with foodstuffs and similar liquids without risk of churning or contamination and will also handle the majority of viscous or corrosive liquids. It operates with high suction lifts and delivery heads, primes itself and will completely clear a pipe-line.

New and improved models of the standard Megator marine, mining and industrial pumps are also shown.

FOUNDRY EQUIPMENT

The **Morgan Crucible Co., Ltd.** (Stand 12, Row E, ground floor, Grand Hall), exhibits a variety of types of foundry equipment, including a new rotary crucible furnace and an hydraulic tilting crucible furnace. Among the products shown are Morganite carbon valves and slides, for use in the manufacture of gas meters, which supply their own lubrication, imparting a film of carbon to the metal counterface. As carbon is inert to all the chemicals and solvents in gas, the counterface is protected from chemical attack, and, further, as the movement is between carbon valves and carbon film, there is no opportunity for a build-up of the gummy resins in gas. Moreover, they have negligible inertia and are non-hygroscopic.

Oldham & Son, Ltd. (Stand 1, Row G, ground floor, Grand Hall) exhibit a range of Poole scientific instruments of considerable interest. For example, the Poole explosimeter, a portable device designed to increase safety in all situations where inflammable liquids are used or stored, provides a simple and reliable means of testing the liability to explosion of an atmosphere containing a mixture of inflammable gas or vapour. Two instruments with particular application for use in petroleum installations, and in solvent process and recovery plants, are also shown. They are the Poole single point combustible gas alarm, and the Poole multipoint recorder and alarm system, which provides in a single unit a means of detecting and measuring, from a central control room, combustible gases and vapour at as many as six remote points.

On Stand 14, in the Grand Hall gallery, our contemporary, the **Petroleum Times,** and its associate publications are on view. The jubilee issue, covering 50 years of oil journalism, which was recently mentioned in the *Journal,* is a popular attraction to visitors.

Rawlplugs need no introduction, but there are certain variations on the famous theme on Stand 6, Row K, on the ground floor of the Grand Hall, which are worthy of note. The **Rawlplug Co., Ltd.,** exhibit, among other products, Rawlbolts (metal expansion bolts) for fixing light and heavy engineering plant and machinery without grounting-in. Among the newer types of fixing devices such as Rawlanchors and toggles for thin and hollow materials, are Rawlclips for instant attachment to metal girders to carry cables, conduits, pipes, starters, &c. Rawltools for speedy hole boring in all kinds of hard materials include durium topped drills which can be used in a carpenter's brace and chrome molyb-

An unusual photograph showing special refractory shapes made in Triangle refractory concrete by the Morgan Crucible Co., Ltd.

denum chisels which can be sharpened with a second cut file. Mechanical, electrical and pneumatic hole boring equipment is also shown and demonstrated.

On Stand 4, Row C, on the ground floor of the Grand Hall, **Reavell & Co., Ltd.** exhibit air compressors of various types for land and marine use, including a four-stage compressor for 300 atmospheres, and two-stage compressors for 150, 450, 600, and 1,000 lb. per sq. in. There are some examples of standard compressors, including a two-stage, double-acting, vertical compressor of 750 cu.ft. per minute capacity, a single-acting, two-stage compressor of 400 cu.ft. capacity, one of the well-known Quadruplex compressors, some single-stage, single-acting, vertical machines, and rotary compressors of various types. There are also two types of rotary air engine for starting internal combustion engines. The equipment, finished in grey and black, looks very well on the cream and blue stand.

A NEW VALVE

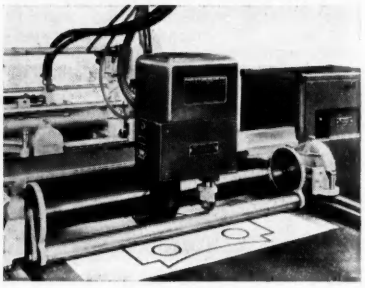
The **Saunders Valve Co., Ltd.** exhibit, on Stand 8 in the Grand Hall gallery, a new valve which embodies many of the features of the Saunders diaphragm valve in conjunction with a straight-through, full bore. Safran centrifugal pumps are prominently displayed and a self-contained unit provides the water supply for the valve display. Two examples of this Unishaft electric pump are shown, enabling visitors to examine the compact, robust build. Amongst the static exhibits is the new self-priming pump with electric 'unishaft' drive, a self-contained Diesel engined pump, a petrol unit, a belt drive set, and a bare-shaft pump for 'driving as you will.'

In the selection of units from the range of pumps on show on Stand 10, centre row of the National Hall gallery, **Sigmund Pumps, Ltd.** draw particular attention to a diesel driven pump unit for emergency fire fighting on board ship. For oil refinery and chemical plant engineers, the focal point on the Sigmund stand is the range of process pumps, represented by a single-stage type HONK5, destined for use in a refinery in the Dutch East Indies, where it will handle 300 U.S.g.p.m. of gasoline at 100° F. against a differential head of 334 ft. The rotating element has been withdrawn from the pump casing, and a reference chart enables visitors to identify and examine the design features of this typical process pump.

An unusual colour scheme with pale blue and pink relief upon a darkish blue ground makes the **Thomas & Bishop, Ltd.** stand distinctive. Various products are shown: Flexo belt treatment for keeping all belts in perfect condition and ensuring efficient transmission; Permac, the original metal-to-metal jointing making permanent leakproof joints for steam, gas, water, petrol, &c.; Flexo tinning compound which cleans and tins all dirty metals in one operation; and Tebeon roofing compound, which gives any type of roof complete resistance to water.

Other specialities shown include: Flexo kneadable metallic packing, Flexo furnace cements, Flexo cored solders, Flexo jointing paste, Flexo black bituminous paint and Flexo water-softening compound. The stand is No. 6, Row A, on the ground floor of the Grand Hall.

A very unusual feature of the stand of the **Turbine Furnace Co., Ltd.,** is the provision on the stand of a full size Lancashire boiler front fitted with Turbine furnace, fan forced draught pattern, the left flue being arranged for firing the grate by means of a shovel or sprinkler type stoker, the right hand flue having a standard hand firing grate. Drawings and photographs showing the arrangement of furnace equipment fitted to all types of boilers all over the world are available for inspection, and as the equipment shown are standard furnaces, there is ample opportunity of inspecting actual parts which would be fitted to standard installations. The stand is numbered 9, Row A, on the ground floor of the Grand Hall.



The electronic head on the oxygen cutting machine shown by Hancock & Co. (Engineers), Ltd.

On an attractive stand, **James Walker & Co., Ltd.,** display a comprehensive range of packings and jointings for all purposes and pressures. These are standard productions and indicate characteristics which have led to the Company's success. The Lion packings, jointings and synthetic rubber precision seals have a variety of uses, and are utilised for marine purposes, for railways, aircraft, oil, hydraulics, general engineering and public utility undertakings. This is Stand 9, Row G, on the ground floor of the Grand Hall.

TRADE NEWS

The increasing use of D.C. rectifiers for converting the local electricity authority's A.C. supply for use in gasworks is stressed in a leaflet on 'Hewittic' rectifiers published by **Hackbridge & Hewittic Electric Co., Ltd.,** Hersham, Walton-on-Thames, Surrey. A typical Hewittic Rectifier consists of a transformer, rectifier unit and A.C./D.C. switchgear. Since D.C. switchgear is already in existence and in the majority of cases the A.C. switchgear is supplied by the supply authority, the cost of changing over from gasworks generating to rectification is therefore negligible. 'Hewittic' rectifiers are available in capacities ranging from 10 kw. to 800 kw.

Kenneth Thelwall, Ltd., Doncaster, give a comprehensive description of the 'Thelson' automatic axle oiler for use on haulage systems in a recently published pamphlet. Designed to obviate oil wastage and to facilitate the lubrication of axle-oiling, the manufacturers claim the following advantages for their machine: (1) It is capable of lubricating axles of varying heights, *e.g.*, with 9 in. or 10 in. wheels. There is no similar type of machine which permits this; (2) installation of the machine entails the minimum of labour, and maintenance costs are negligible; (3) due to there being no oil well or tank below rail-level, the possibility of contamination of oil is eliminated and the fact that the oil is fed directly from the vent pipe to the skid bars, where it is immediately picked up by the tub axles, ensures no oil-wastage.

Stewarts and Lloyds, Ltd., with subsidiary and associated companies, are exhibiting a comprehensive selection of their products at the Scottish Industries Exhibition. The exhibits displayed give an indication of the increasing use being made of steel tubes and fittings. Exhibits include steel tubes and fittings for the conveyance of steam, gas, air, water, oil and sewage; a variety of joints and couplings to suit different working conditions; examples of protective linings and coverings in common use; samples of welding fittings; and different types of tubular steel lighting columns as approved by the Royal Fine Arts Commission.

The centre piece of the stand, which is fabricated from steel tubes, illustrates the use to which steel tubes can be put in structural work, either as individual members or as prefabricated components such as roof trusses. This idea is further amplified in the 25 ft. high tubular steel pylons, manufactured by Stewarts and Lloyds, which line both sides of the Queensway, the main avenue of the Exhibition.

Other features include models and photographic enlargements showing fabricated and manipulated tubular steel products which typify the contribution that the Company has made to meeting the modern needs of municipalities and public works, mining, agriculture, railways, shipbuilding and the oil industry.

Details of a new heat resistant aluminium paint are given in a leaflet published by the **Atlas Preservative Co., Ltd.,** Fraser Road, Erith, Kent. After exhaustive research, Atlas Aluminium Paint No. 2845 has been found capable of withstanding temperatures of 600°C., without any detraction of adhesive powers, paint film and with no noticeable loss of decorative value. A quick-drying product (approximately 30 min.) No. 2845 may be applied by either spray-gun or brush and its covering capacity is estimated at approximately 800 sq. ft. per gal. Particular applications of the paint include boiler fire-doors, furnaces, and coke-oven steelwork, and good recommendation is given by a gasworks who express their complete satisfaction of the paint under severe test conditions.

The Potterton Gas Division of **Thomas De La Rue & Co., Ltd.,** entertained on Aug. 23 some 40 members of the Women's Gas Council, Cannock Branch. During the morning a visit was made to Warwick Castle, and in the afternoon they visited the Porto Bello works where they were welcomed by Mr. Poyser and later briefly addressed by Mr. Taylor,

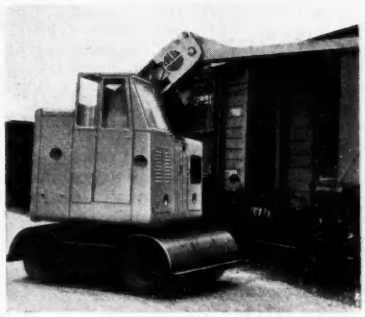
who explained some of the technicalities of manufacture. In parties of seven the visitors were then conducted round the works where they saw the processes of manufacture of the De La Rue Cooker from raw material to finished assembly. Great interest was shown in the new large capacity cooker (illustrated above), of which a number of models were exhibited.

The gas industry stepped into the limelight at the recent Festival Cavalcade Exhibition of the St. Cuthbert's Co-operative Association, Ltd., in the Waverley Market, Edinburgh. Normal policy in such exhibitions is to hide the gas boiler in the depths and to regard its services as too normal to justify attention. Here the boiler was given a premier place in the show, a lovely coat of crimson paint, and a beautiful background with Mr. Therm in a prominent position. The boiler was a Brockhouse, 5 v.s. unit, manufactured by the Brockhouse Heater Co., Ltd., set boldly in the main hall and supplying the canteen, dairy and laundry with steam.

A particularly clever idea was the use of a mirror set in the floor of the stand in such a way as to show the jets functioning. A gas poker was also incorporated in the unit. The display was organised by the Scottish Gas Board, through its Edinburgh area and the St. Cuthbert's Co-operative Association, and involved a considerable amount of preliminary work.

We have received from **Perl Controls, Ltd.,** details of the 'Thermoperl' electromagnetic pilot safety valve. This safety control was first developed about 18 months ago when a considerable demand for a valve of this type coincided with a cessation of the only source of supply from the U.S.A. The 'Thermoperl' valve first appeared exclusively on the market in September, 1948, complete with thermocouple and pilot burner. The manufacturers say that continual research is being undertaken to develop the 'Thermoperl' for other applications and that many improvements over the U.S.A. prototype have been incorporated.

In a pamphlet received from **Steels Engineering Products, Ltd.,** 14, Berkeley Street, London, W.1, details are given of the Coles Searcher Jib, full circle slewing crane, the latest addition to Coles cranes. Designed especially for the handling of bulky materials within confined space and complete manœvrability, the searcher jib is capable of the movement of heavy loads either horizontally or vertically (both up and down). Limited headroom presents no difficulty as the searcher jib is capable, by attaching a fixed hook at the jib head, of removing



The jib cranked upwards to handle goods from ground level. (Photo by courtesy of the G.N. Railway Co.)

objects through doorways and other similar apertures of only slightly greater height and width than the object itself. Further outstanding advantages of the searcher jib are its ability to stack merchandise to heights hitherto unattainable by a crane of this size and lift objects from either ground or platform level.

COMPANY RESULTS

South Western Gas and Water

Presiding at the annual meeting of the South Western Gas and Water Corporation in London on Aug. 18, Mr. C. Holmes Hunt, M.A., recalled that a year ago he pointed out to the proprietors that in view of their interests outside gas they were a borderline case under the Gas Bill, and, therefore, at the Board's submission, the Ministry of Fuel and Power was then considering the possibility of the corporation being excluded from the Bill. The Directors were now concerned with the valuation of their gas interests, and in this connection at meetings of gas subsidiaries he (Mr. Holmes Hunt) was appointed stockholders' representative under the Gas Act, to negotiate and agree with the Ministry of Fuel and Power the valuations of their various gas interests. It was the Board's intention with the moneys to be received from its gas interests to carry on as an investment trust, but as stockholders were aware from recent communications received, the Board was recently approached by Close Brothers with a view to the acquisition by them of a majority holding in the Corporation. Consequent upon the substantial change in the nature of a large part of the Corporation's investments the Committee of the Stock Exchange decided to withdraw permission to deal in the securities of the Corporation pending the publication of an advertisement for information. It was intended that this advertisement should be published in the course of the next few weeks. This had been delayed solely by the desire to give shareholders the latest information on negotiations now actively proceeding for the acquisition of further industrial interests allied to the present ones. Net revenue for the year was £18,198, to which had to be added the amount brought forward from last year, £4,477, making an available balance for distribution of £22,675.

Nico Light Engineering Co., Ltd.

The accounts of the Nico Light Engineering Co., Ltd., for the year ended Mar. 31 show a profit of £11,782. After bringing in £7,510 from the previous year and transferring £7,000 to reserve, a dividend of 10% and a bonus of 5%, making 15%, less tax, leaves £7,827 to be carried forward. Mr. R. E. Green, Chairman, in his statement, included in the report and accounts, states that sales are being well maintained and that new lines are being continually added to the Company's productions. A decrease in trading profit as compared with the previous year, from £37,786 to £35,226, is due mainly to rather severe competition which has necessitated an adjustment of selling prices; the modern plant and machinery now in operation has enabled this to be done without seriously affecting the position. The purchase tax has also hampered the Company's activities, affecting the sales of several of the Company's important customers to whom component parts are supplied, and resulting in the temporary suspension of a number of orders on the books. In consequence stocks are somewhat higher than in the previous year.

Gas in France

From Our Own Correspondent

CONTINUING his series of articles on the architecture of industrial structures, M. Veillon explores, in the May issue of the Journal des Usines a Gaz, the architectural possibilities of brick, and in the June issue, the treatment and finish of roads, pathways, and paving generally. Although brick is essentially an industrial material it has been little used in France for the construction of buildings seriously studied from the architectural point of view. Its employment is, however, extensive in Britain and the nordic countries and achieves real success.

Brick may be used simply as a filling for the panels in steel or ferro-concrete framework, or it may constitute the whole of the exterior, the framework being hidden. The first mentioned is that most frequently employed. The appearance is often commonplace (banal) but it has some small architectural possibilities. The composition will play upon the lines of the framework and the surface may be relieved by contrasts between the framework and the brick filling and by the use of bricks in differing colours. Of the greatest importance is care in the execution of details, particularly the joints. Decoration, without relief, may be obtained by the use of the light-coloured lime and sand brick contrasted with red and blue in designs with lines of one or the other, lozenges, crosses, chequer work, &c. Opening for light and ventilation also present decorative possibilities. The use of glazed bricks for this purpose calls for care and is not recommended but brickmakers are now producing bricks and similar materials in a great variety of finish and colour of which advantage may be taken. In designs where the framework is covered the decorative effect is obtained by exploiting the essential character of brickwork with pilasters and panels and with horizontal bands in relief, in white or in colour. Heaviness in treatment and finnicking details are both to be avoided.

Is it permissible to think of sculpture in brickwork? There are celebrated examples in the works of antiquity and in the Renaissance Period, but this technique must be revived with caution and in great simplicity. The essentially sober character of industrial architecture must be constantly in mind, but flutings, mouldings, rounding of corners horizontal and vertical, may all be used. M. Veillon concludes that there are indeed great possibilities for the architect in the treatment of brickwork, but he utters a warning against any attempt to transpose into the industrial structure arrangements and decorations, however appropriate these may be in public buildings and structures which are decorative in themselves.

On paving, M. Veillon goes into considerable detail about the many materials available. There is a short but informative section on internal coverings for concrete coke bunkers to protect the surface against corrosion and erosion. On the æsthetic aspect of the treatment of the ground surface round buildings, he stresses the importance of coloration. Modern facilities present the possibility of getting away from the dull uniformity of black or grey. Contrast should be sought between the building and the ground upon which it stands, particularly at the base of the walls. If tarred surfaces must be used their dark colour may be relieved by different tiles and other materials in light colours for curbs and edgings. Most important of all is to insist on work well done and well designed. Roads and sideways of generous proportions give an air of distinction to the buildings adjoining them.

Evolution of French Gas Industry

In the May issue the Editor refers to the evolution of the gas industry in France. 'Every month which passes brings some new fact in the shaping of the national service, *Gaz de France*. From the sum of these facts will come the general organisation of our industry.' In the first Law of 1949, which deals with the gas industry, may be seen the broad outline of its financial independence and the steps to be taken towards its healthy development in the next three to six months. Two immediate problems are the claims of the personnel of all ranks and the question of the price of gas. This question of tariffs is delicate because it is necessary to recover the existing large deficit without abandoning the re-equipment of existing works or the construction of the new central installations contemplated in the Monnet Plan. An immense effort of reorganisation is going forward, but the reduction of expenditure has its limits and the simple step of reducing manpower cannot solve the problem. Several of the installations already described are capable of being operated by fewer men than hitherto with a production one and a half times that of 1939. The deficit arises principally from the disproportion between the rise in the price of gas and that in the cost of coal, the coefficient of increase in the former being no more than 8 while in the latter it exceeds 20. An adjustment is, therefore, necessary to relieve a disequilibrium which has last too long.

The June editorial refers to the satisfactory show made by gas at the Foire de Paris and to the participation of French technicians in the Fourth International Congress held in London in June, both evidences of the virility of *Gaz de France*. 'The recent vote of the legal depositions which modify and clarify the Law 49/1' (above referred to) 'underline the important position in the national economy which will be taken by the gas industry, possessing financial autonomy but organised in close liaison with the electrical industry and in perfect co-ordination with those of coal and petrol. All this is an excellent reason to react against the malaise which in these days seems to have arisen in gas circles and which it is desirable to efface as soon as possible.'

Storage Capacity of Mains

Abstracts of lectures delivered at the April 'Gas Week' are given in the May issue. M. J. Delaruelle dealt with present day tendencies in the construction of feeder mains. He referred to the considerable quantity of gas stored in long mains under pressure. He suggested that two such lines might be laid, one serving for the transport of gas, the other serving as a reserve, the two interconnected with valves at intervals. M. Delbourg continued his own subject of combustion and the formation of flames. He suggested that, though the study of combustion phenomena is very complex, thanks to the flexibility of gas appliances it is often only necessary to determine combustion characteristics to establish the suitability of proposed mixtures of gases. Underlining the diversity of sources of gases in France, M. Delbourg wishes to see the development of these new methods of control to give the greatest possible satisfaction to the consumer. M. H. Lefebvre lectured on the properties of coal and coke. It was necessary to know much more about coal than its elementary composition. The search for the fundamental coal substance must go on. The use of petrography was described, together with the new methods of the physico-chemist, the use of X-rays, &c. The problem is difficult and the day seems still far off when it will be possible to say exactly what coal is. M. G. David dealt with the position of propane in the gas industry. In the Monnet plan are schemes for the establishment of oil refineries and it was hoped that within a year there would be developments in the distribution of propane which would compare with those in America. Other lectures covered such diversity of subjects as the rubber industry, statistics of the gas industry (when one complains of the inaccuracy of statistics the error is generally in the use made of them; 'no statistics can dispense with good judgment'), the applications of electronics in the gas industry, technical progress in the construction of appliances for use with solid fuel, and the relative merits of direct and alternating current motors in the gasworks.

A list is given of 39 technical papers to be presented at the June meeting of the Association Technique de l'Industrie du Gaz en France, held at Lyons.

There are two technical articles of considerable interest: M. L. Charles on the distribution of natural gas in the South-

West of France, and a report on the utilisation of heavy oils in the gas industry. 'Straight' natural gas is now being distributed in the South-West Division direct to the consumer. The composition is about 95% methane and 5% higher aliphatics with a l.t. of about 990 B.Th.U./cu.ft. (942 minimum guaranteed) and a density of 0.6, after recovering the gasoline. It was decided that this gas could not be distributed direct in Toulouse on account of the excessive number of appliances, but the task in Saint-Gaudens was not too formidable, appliances being modified simply by reducing burner orifices; Orthez and Pamiers were similarly dealt with. Because of the low velocity of flame propagation with natural gas, white flame burners were replaced by bunsens, particularly in certain cookers, and in some cases a new type of aerated burner was installed. There were modifications, too, in pilot and similar flames. To effect these alterations a workshop was set up in Orthez to which appliances were taken in relays, but in Lourdes, where there are many central heating and commercial kitchen installations, modifications were carried out *in situ*. The problem of leakages with this type of gas is of great importance and requires special care and attention.

In the shortage of coal following the war, France was compelled to turn her attention to oil, and particularly to the use of heavy (fuel) oils for which a vast programme of importation and consumption was inaugurated. From 25,000 to 30,000 tons of gas oil had been used annually before the war for the carburation of water-gas, but with the increased price of this oil it became necessary to consider its replacement by cheaper grades. Some installations of medium capacity have been converted to the use of heavy oil, but in large installations paraffinic distillates have been used with satisfaction, either alone or mixed with gas oil. Heavy oil has been successfully used for the production of oil gas by injection into horizontal and vertical retorts. The use in producers of broken coal impregnated with these oils was not so successful, but crockery in generators of the GEIM type has given satisfaction. The use of heavy oil for firing settings of intermittent verticals was found to be uneconomic.

Retort Producer Practice

GASIFICATION RATE AND GAS CHARACTERISTICS

By GAS CHEMIST

A KNOWLEDGE of the characteristics of the producer gas is a major factor in the successful control of the heating of retort settings. Items requiring elucidation are the following:—

(1) The proportions of the major constituents, CO_2, CO, and N_2 in gas.
(2) Water vapour in gas.
(3) Rate of gasification.
(4) Efficiency of steam cracking.
(5) Temperature of gas leaving the producer.

In the following remarks it is assumed that the producer is consuming coke only.

The analysis of the gas for major constituents may be made more or less completely according to the amount of information required and the laboratory facilities available. In its simplest form, the analysis may consist of a simple determination of CO_2 and CO by means of the Orsat type apparatus. If more detailed information is desired, it may be necessary to use a Bone & Wheeler apparatus or other type capable of estimating hydrogen, methane, and nitrogen.

Significance of the Analysis

The significance of this analysis may be briefly summarised as follows: Generally speaking, the higher the proportion of CO, the more satisfactory will be the results of the producer plant, but this generally must be accepted with certain modifying considerations.

A high percentage of CO means high temperatures of gasification, or a long time contact of air and/or steam, with the fuel.

Taken by itself, it may mean either a high or a low rate of gasification. In producer practice, the reactions of steam and air with carbon, the former endothermic and the latter exothermic, are so proportioned that exothermic effects predominate. This is a prime necessity for continuous gasification, and the gas escaping from the offtake carries with it a considerable amount of sensible heat. If exothermic reactions did not predominate, as would be the case if the steam : air ratio exceeded a certain limit, the fuel bed would be cooled to such an extent that the fire would go out.

Carbon monoxide is essentially a high temperature product or a product of long time contact of CO_2 with carbon. Consequently, if we have a high rate of gasification—*i.e.*, rapid development of heat within the producer, the average temperature of the fuel bed becomes high, and the proportion of CO in the gas rises accordingly. If, however, the rates of air and steam flow are very low, temperatures are not so high, since there is less total heat, but the time contact of gases with the hot carbon is increased and the CO_2 originally formed has a better chance to become reduced to CO. Thus, we may have a gas containing quite as high a percentage of CO with low gasification rates as with high rates, the difference being, however, that, although we have the quality necessary, we do not have gas in sufficient quantity for the job. Whether the high CO content is due to high or low gasification rates will be known if the rate of consumption of coke is known.

Sources of Damage

Thus, we may say that, provided the rate of evolution of gas is satisfactory, the higher the proportion of carbon monoxide, the better the producer is working. Here again we may strike another snag. High fuel-bed temperatures are good for gas-making, but they are not always so good from the point of view of clinker troubles. Unfortunately we are not (a) burning pure carbon, and (b) employing an infinitely heat-proof vessel in which to make our gas. Taking the latter first, the producer parts—*e.g.*, the grate and refractory lining—will, if subjected to too high temperatures, become damaged or destroyed by fluxing or, in the case of ironwork, actual combustion and warping. Coke is not pure carbon, and its most troublesome impurity is its ash, which, at the temperatures prevailing becomes either softened or completely fused. Even where fusion does not take place, as with an ash consisting largely of lime, the ash may be very corrosive to the refractory brickwork, with which it forms fusible silicates.

It is not only the corrosive effect which is a disadvantage and source of damage, however. The semi-fused ash, forming agglomerations with the coke, becomes the familiar 'clinker,' the presence of which in the fuel bed will cause trouble by encouraging 'rat-holing,' irregular flow of uprising steam, air, and gas, and which gives trouble by blocking the spaces between the firebars. All these troubles may be looked for if the fuel bed temperature is very high and one object of steam admission is to keep the temperature within the best limits—*i.e.*, to achieve a reasonable compromise between temperatures so high as to cause trouble, and

temperatures so low that the quality and rate of generation of the gas suffers. High CO content is accompanied by low CO_2, and *vice versa*. It is difficult to generalise as to what is a satisfactory figure for the percentages of these constituents. So much depends on the nature of the fuel, the design of the producer, and (often forgotten) the skill and conscientiousness, of the fireman. Carbon dioxide percentages may vary from, say, 3% to 8% and CO from, say, 24% to 30%. Many authorities fix 5% as the lowest limit for CO_2, an ideal figure being between 6% and 7%.

The proportion of hydrogen in the gas is also a guide to the conditions prevailing. All the hydrogen, with the exception of traces from the coke, is derived from the steam or water supplied to the producer, and, in general, a high hydrogen figures indicates high steaming. The limits for hydrogen are between about 7% and 13%. If a high hydrogen figure is accompanied by a high CO_2 figure, over-steaming may be suspected, since the 'low-temperature' water gas reaction is probably taking place.

Apparatus for Analysis

The Orsat gas analysis apparatus in its standard form is not adapted for the determination of hydrogen, but there are modifications which permit of a direct determination of nitrogen by combustion over copper oxide. By making use of this apparatus, and assuming a figure of 0.4% for methane, a reasonably accurate figure for hydrogen can be calculated by difference ($100\% - (CO_2 + CO + CH_4 + N_2)$). (The assumption for methane is not, of course, justified if any *coal* has been consumed in the producer, but this is hardly likely in gasworks practice.)

Determination of moisture content of producer gas is occasionally necessary, as for example in constructing heat—or product—balances, as a means of determining steam cracking efficiencies and as a guide to working conditions. The test may be readily carried out by aspirating a few cubic feet of gas through a series of calcium chloride tubes and metering the gas at the outlet, care being taken to avoid (a) prior condensation in sampling connections, (b) dust being carried to tubes and weighed as moisture. A copper gauze filter will usually serve for the latter purpose.

The following calculations may be made to estimate the percentage by volume of water vapour in the gas, the rate of gasification of the producer, and the percentage of steam cracked:

DEFINITIONS: *'*'*Moist Gas*'=dry gas+quantity of water present when all the water is in the vapour form.

It is not necessarily '*Saturated*' gas.

†'*Gas Saturated at* 60° *F and* 30 *in. Hg.*': =volume of gas after cooling from the temperature at which it leaves the producer and depositing any vapour as liquid, which is in excess of that necessary to saturate it at 60°F., or (in the event of deficiency of water in the gas) after taking up such added water as is necessary to saturate it at 60°F.

MOISTURE TEST, using Calcium Chloride absorption.
Let x= grammes H_2O taken up in V tubes.
„ V= gas volume, in cu.ft. passed during test (60°F. and 30 in. Hg. sat.).

Then % water vapour in *moist* gas by volume

$$= \frac{4.63x}{0.0463x + 0.9826V} = K$$

RATE OF GASIFICATION:

Let weight of coke per producer per hour=W lb.

Suppose carbon *gasified* (*i.e.*, allowing for loss in clinker, &c.), is 80% by weight of coke=0.8 W.

Suppose producer gas analysis by volume is: $CO_2 - a\%$
$CO - b\%$
$CH_4 - 0.4\%$

Then:

(1) Volume of gas per producer per hour, calcd. to 60°, 30 in. sat.

$$= \frac{2{,}567\ W}{(a+b+0.4)} = P \text{ cu.ft.}$$

(2) Volume of dry gas per producer per hour calcd. to 60°F., 30 in. Hg.

$$= P \times 0.9826$$

(3) Volume of water vapour per producer per hour calcd. to 60°F., 30 in. Hg.

$$= \frac{K \times P \times 0.9826}{100 - K} = Y \text{ cu.ft.}$$

(4) Volume of moist gas per producer per hour.

$$= (P \times 0.9826) + Y \text{ cu.ft.}$$

PERCENTAGE OF STEAM (OR WATER) CRACKED:

Let weight of steam per producer per hour (including steam from water on firebars, &c.)=S lb.

Weight of water vapour in gas per producer per hour $= \frac{Y}{21.03}$ lb

Deduct 5% by weight of coke (*i.e.*, $\frac{W}{20}$) to allow for water derived from moisture in coke.

This gives:

Uncracked steam per hour per producer $= \frac{Y}{21.03} - \frac{W}{20}$

=Z lb. from steam and water to bars.

$\therefore$ Percentage steam cracked $= \frac{S-Z}{S} \times 100$.

BOOK REVIEW

Factory Legislation

There have been many important changes in the administration of the Factory and other Acts in the past few years, and the need for an up-to-date and comprehensive guide to such legislation has been met by the publication of the 17th edition of 'Redgrave and Owner's Factories, Trucks, and Shop Acts,' by John Thompson, M.A., of the Middle Temple and the Northern Circuit, Barrister-at-Law, and Harold R. Rogers, M.A., Bell Yard, Temple Bar, London, W.C.2. (Butterworth and Co., Publishers, Ltd., 45s., postage 1s. extra.) Since the publication of the 16th edition the introduction of the Factories Act, 1948, has brought numerous and important amendments to the Act of 1937; these modifications are published in the new edition, together with two other Acts, the Education (Scotland) Act, 1946, and the National Insurance (Industrial Injuries) Act, 1946, including a variety of orders extending and adjusting requirements which apply to factories and other premises.

The authors say that in recent years the tendency has been for the Secretary of State to make special regulations to constitute a code applicable to a particular industry and aiming to deal specifically with the particular risks of that industry. The most ambitious and comprehensive of such codes is the Building (Safety, Health and Welfare) Regulations, 1948, the text of which is included in the new edition. Important decisions have been given in the courts in connection with various sections of the Acts and Regulations made in pursuance of the Acts. These are noted under the appropriate requirements, and cross references have been made where necessary. The textbook has been pruned to eliminate material which has become obsolete and irrelevant, and provides a complete record of recent changes up to the end of April, 1949.

A French report deals with the prospects of coal mining in the Djerada basin in French North Africa. This was believed to hold a proved total of 100 mill. metric tons of coal, but more recent investigation has put the total at a minimum of 1,000 mill. tons. From 268,000 metric tons in 1947, output rose to 290,100 metric tons last year, and is expected to total 400,000 tons at the end of the current year.

GAS PROBLEMS IN IRELAND*

By T. D. HAMILTON

LET me confess that at the outset my thoughts more or less unconsciously were those of a Northerner rather than the thoughts to be written down in the address of the President of an all-Ireland Association. We must not forget, however, the broad fact that economically we are all rowing in the same boat, every man, I hope, pulling his weight, and all pulling in harmony towards a desired haven—prosperity. We have a free foot and a fellow for it, as the saying goes, and if we grasp our opportunities we shall be in a better position than ever to carry on our great work.

In the early days the gas manager had to know something of brick-laying, engineering, carpentry, and plumbing, not forgetting accountancy. He had also to be a man of common sense. Many of you moderns, too, no doubt can lay claim to be Jacks of all Trades. In your hands lie the present and, to a large extent, the future of this great industry.

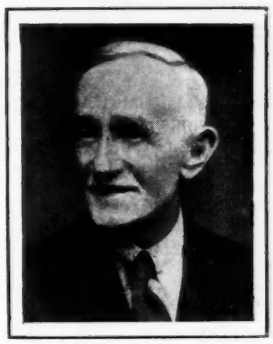
Let me turn back to the address of the President of 1931. A year when the gathering clouds of electrical competition were ominous and lowering. At that time our co-operative partner in the service of the people had strange notions of making gas a back number. Perhaps it was the exuberance of youth, but I can say without wishing to cause offence to an industry which admittably is fulfilling its promise of service to the people and doing it well, that in 1931 such was the idea. At the time the gas industry was inclined to take a gloomy view of the coming competition and, indeed, in a few cases a spirit of defeatism was apparent.

The President of 1931 thought it was time for someone to step into the arena and, taking up the cudgels in aid of the industry, made a most refreshing reference to the situation, which was in itself a challenge to the gas industry to be up and doing. It must have been the tonic we needed, for his words called for a new birth of that old fighting spirit which our industry somewhat lacked for the time being. Today both industries realise that each has its part to play, that we are not implacable rivals, but co-partners in the service of the public, which we in the gas industry are proud to say we have not failed. Today I am glad to say we work harmoniously together, gas recognising the indispensability of electricity and electricity on its part acknowledging that gas is an industry which cannot be done without, here to stay and the panacea for the troubles of millions of people.

The President of 1939 spoke of rising prices, growing competition, industrial unrest, and a thousand and one difficulties, the magnitude of the changes and improvements which had taken place in plant and appliances and, last but not least, the change from the engineering to the commercial tone of the industry.

If rising prices, cost and labour unrest gave us concern 10 years ago, what can we say of today? Can I with confidence say with the President of 1939 that it is still possible to teach the old dog new tricks and despite the situation still sell gas and make ends meet? Ten years ago the rises in price of coal and plant were bad enough, but today they are appalling. Have they reached the peak? I do not think we can feel easy on that score. No industry, and certainly not ours, can feel easy today; but as my message is one of hope and courage, it is up to us, peak or no peak, to take arms against a sea of troubles and, by opposing, end them. Rising costs are to be deplored, but one good thing emerges, our labour is peaceful, doing well for us if at the same time doing well for itself. Let us hope that this fine body of men are realising, as we all do, that the Utopia promised by our dreamers is a mere promise, and that the real way to recovery and prosperity is hard work for all—labourer, clerk, or industrialist.

During the war years I used to be astounded at the raw material for carbonising sent over to Ireland. Slurry, I think, was its name, dug from the dumps of the coal mines, unsaleable and forgotten until some bright boy thought it would be good enough for Eire. Nevertheless you made from it gas of a kind and kept the works going. Today you are perhaps more at ease for I understand coal reaches your works not perhaps in that free flowing stream as it did once upon a time but sufficient unto the day.



Mr. T. D. Hamilton, the first President of the newly-constituted Irish Gas Association, which now admits manufacturers of plant and appliances to full membership, is Irish representative of Alder and MacKay, Ltd., and Wm. Sugg and Co., Ltd.

Give us the tools and we shall deliver the goods. But the aftermath of the war years tells its tale. It seems impossible to get the tools. Our manufacturers of plant, cookers, fires, &c., are working all out to supply us with our vital needs, and on top of that comes housing with all its commitments and responsibilities. If ever there was a time when we should tighten our belts, it is now.

Millions of people use gas for light and heat, satisfied that it is the fuel to suit their purpose, and showing no desire to have any other. Paradoxically there must be something solid about gas to account for this. By gas the wheels of industry keep turning and we make our factories and workshops comfortable to work in. By gas we bake the daily bread of the multitude. By gas we cook the meals of millions of our people. As civilisation advances gas goes hand in hand with it, and we have in gas refrigeration the last word. Water heating by gas is the vogue today, and if we could be set free from that iniquitous purchase tax, what a wealth of business could be visualised. Then we have radiant heating with wonderful possibilities. Surely such an accumulation of assets should make us all feel proud that we belong to an industry which offers so much at so little cost.

In the distant past meters were of the wet type, and it was customary for the consumer to give the meter a drink to keep it in good humour. Nevertheless, that old wet meter was a very reliable apparatus and the Jeremiahs of the period prophesied that if the wet meter was withdrawn in favour of the new-fangled dry type anything could happen. But the wet meter had to go, and the dry type took its place without any of the prophesied evils.

In 1889 came a startling innovation, the prepayment meter, which was something the gas managers had been almost praying for. No doubt it gave gas a new lease of life, as the mantle did for lighting. In process of time the lights type was superseded by the Standard. The industry demanded still more changes and the answer of the makers was the high capacity meter—a wonderful piece of mechanism. In its early childhood it had its natural teething troubles, but these were overcome.

Meter manufacturers have had their own worries, short supply of parts and metals being among their bugbears. Housing has cause a tremendous demand and I think few of them have

* From the Presidential Address to the Irish Gas Association, Sept. 6, 1949

failed in the efforts to give service. The gas industry has had to wait longer than usual for delivery, but on the whole 'give and take' has seen us well through our troubles.

Gas lighting of our towns is not now of so much interest to Eire as it is to the Northern section; but I regret that so many of our elected councillors are unmindful to the interest of the towns which own their own gasworks. I could give you examples of really first class lighting by gas in towns up north scrapped for more expensive electric lamps giving no better results.

Every gas lamp scrapped means less output for the local gasworks, and it must not be overlooked that these municipally owned works pay large rates. In scrapping their gas lighting it simply means robbing their own roosts. First class lighting by gas is beyond argument. We need only look to Birmingham, London, and to come nearer home, Belfast, which is beyond doubt a first class example of what gas lighting can do. Modern gas lighting has the advantage of high efficiency. It has also a beneficial psychological effect.

For the small works, increase in sales is a most pressing problem. The solution lies in new plant at a cheap price. But are we making full use of what we have? Are there other avenues we can explore and exploit? Industrial heating is one and hotels and churches are open doors.

Housing schemes have been a mixed blessing. They have helped our output, but at what a cost: Mains, meters, and cookers have to be paid for, and with some undertakings the capital is not forthcoming even if a scheme would be a paying proposition. Municipally owned gasworks can borrow at a cheap rate, but not so the private utility concerns. Housing generally has been prodigal in its expenditure and I think some luxuries could very well have been omitted. However, through gas service, the housewife has had her burdens lightened and the business man's problems of heat and power have been simplified and his factory made more efficient.

MATTERS OF INTEREST TO THE SMALLER GAS WORKS*

By T. F. HASTINGS,

Engineer and Manager, Omagh Gas Department

In this paper the author indicates methods of reducing the amount of time that the manager may devote to the supervision of his works, and suggests that if supervision takes up much of his time, the introduction to his works of the apparatus detailed in the paper will undoubtedly set his mind at rest on the question of uniformity of quality. In this way, the author argues, he will be free to concentrate on the development of sales, without which capital will never become available to enable him to carry out extensions and improvements of a larger nature.

I HAVE been persuaded to write this paper in the hope that it will partially meet the complaint that the very small works is not catered for at these meetings, and in the further hope that by presenting it in simple and non-technical language, others may be encouraged to come forward and give us the benefit of their experiences.

Gaining Experience

I had the wrong impression at one time that if really high makes were desired, the sky was the limit so far as retort temperatures were concerned, and that a little over-pulling would not do any harm. I soon discovered, without realising the cause at that time, that although we were obtaining higher makes, we were paying an exceedingly high price for them in the form of choked ascensions and pitch forming in the hydraulic mains. Indeed, at times we were pulling pitch out of the tar main literally by the yard. No regard was paid at that time to the amount of fuel used in the producers, and this I discovered to my cost when it was too late. This may all sound unbelievable to those who have not had similar experience, and I admit quite freely that these troubles were due in no small measure to inexperience and youthful desire to return better results than my predecessors.

Economical Carbonisation

I am a great believer in the conservation of heat in our retort settings. It is relatively simple and cheap to insulate side walls and main arches, but we have a long way to go before finality is reached so far as the fronts of our settings are concerned. By way of example, have you ever tried to imagine what size heap of burning coke would be required to radiate the amount of heat which is lost through the front iron work? Remember too, that this goes on 365 days each year. Great honour awaits the engineer who solves this very real problem. Perhaps I should mention that as the results of partial insulation, my sales of coke have shown an increase and now average 11 cwt. per ton carbonised.

I have had experience of several types of producers, and I should like to put on record, for the benefit of small works where the cleaning of producers is very often exceedingly laborious, that in my experience of the 'Sydenham' grate we have not had to empty or drop one of these producers for cleaning or clinkering during the past three years.

A final word on this question—and this must sound very elementary, but I think worth repeating—never have a vacuum at your combustion chamber. If you do, you will consume an unnecessary amount of fuel.

Type of Retort

The retorts in Omagh were all 21 in. by 15 in. solid fireclay, and these I had changed to 22 in. by 16 in. silica segmentals.

I cannot speak too highly of the advantages of segmentals. It is certainly no exaggeration to state that these have twice the life of solid fireclay retorts, and accordingly are a far cheaper job in the long run. The merits of silica are too well known to require further comment.

Increasing the size of the retorts from 21 in. by 15 in. to 22 in. by 16 in. made a world of difference to us so far as throughput of the retorts was concerned, and if you find that your present retorts are insufficient at times, increasing the size may save the cost of lighting up an additional or stand-by bed.

As already stated, I have had ample experience of choked ascensions. I have tried out many ideas to eliminate these

* Paper to the Irish Gas Association, Dublin, Sept. 6, 1949.

troubles, the most successful of a temporary nature being the fitting of cold water sprays to the pipes which were giving most trouble, running the tar off the hydraulic mains each shift and, in general, keeping the top ironwork cool. Those who have had experience of burning out choked ascensions realise what a slow and laborious job this can be. I found that a small air compressor to induce draught enabled me to burn out completely the most stubborn choke in a little over one hour—and, mark well, without the need to auger to any great extent.

Admittedly today I know the real reason for my troubles at that time. I was simply distilling the tar in the hydraulic mains, thus forming pitch, and the moral here is to run tar off frequently and keep the top ironwork cool. Ultimately, I completely eliminated these troubles by the application of elementary principles. For example, I departed from hydraulic seals because of the excessive pull required to overcome uneven dip pipes, and I paid more than ordinary attention to the question of more accurate governing, and above all the avoidance of erratic overpulling.

At this time I was made to realise how haphazard my vacuum control was. I had great difficulty impressing upon the stokers the fact that a mere 1/10 in. pull was in effect a tearing vacuum. Was this to be wondered at, considering that they had been used to at least 20/10 in. pull before the change over?

Improvement of Vacuum Control

The immediate improvement in thermal yield brought about by the introduction of dry main working, together with noticeable inaccuracies in governing, suggested that improvement could be made in vacuum control. A means of doing so came to my notice when visiting a neighbouring works and I lost no time installing apparatus similar to what I saw there. This might be more accurately described as a relay attachment, or remote control of the exhauster compensator (which is the only governor available), and has proved itself to be the greatest boon imaginable.

The controller really has to be seen in action to appreciate how sensitive it is. Immediately the retort door is closed or the anti-dip raised, the controller passes more water to the loading tank on the exhauster compensator arm, increasing the pull to deal with the surge of gas from the fresh charge, and gradually easing off the supply of water as the surge from the retort passes. The fact that an alteration to the vacuum can be made without leaving the retort house makes this attachment almost indispensable today when labour is so difficult to control, and when we must extract the last ounce because of high costs.

Of perhaps more importance, however, is the fact that once the vacuum is set it cannot increase when the charges are almost spent, as would happen using an exhauster compensator and weights, because it follows that as the amount of gas in the foul main decreases, so the vacuum increases and thus we resort to overpulling, the one evil we must avoid. Certainly anyone who has experience of this controller would never return to the use of weights on the exhauster arm.

We use an Arkon vacuum recorder, and it was quite by accident I discovered that when connected to the foul main it records in no uncertain fashion by delineating a vertical line each time a retort is charged. I have realised the need for such a record for many years now, and you can appreciate how pleased I was when I made this discovery.

The need for regular charging cannot be emphasised too strongly and unless a recorder is in use, stokers will continue more or less to charge to suit themselves, the result being that very often the majority of the charges are spent before being relieved by the next shift. Under such conditions a straight chart becomes impossible on the C.V. recorder.

I have yet to see a better method of extracting the maximum amount of a constant or uniform quality than is made possible by the method I adopt—namely, a 'Quick Indicating Test Light.' With this apparatus, which is inexpensive to install, the stoker is left without an excuse for 'bad gas,' and certainly cannot say, 'the flame has just gone, sir.'

This pump takes a continuous sample of gas from the foul main close to the hydraulic, and it completely eliminates the time lag which occurs if the 'make flame' is taken from the outlet of the purifiers, or, an improvement on this, the outlet of the washer. Any change in quality becomes apparent in 60 seconds, and the flame need never be low for a longer period, but, perhaps of equal importance, gas of a higher quality than required need never be made for more than one minute, as could and does happen when there is a long time lag. It follows, however, that without supervision, particularly during the night shift, inferior gas could be made, and while, the night shift may be suspected, it is another matter to provide proof. The obvious solution to this problem is a C.V. recorder. In my opinion a recorder is better than any supervision, as if fitted to the 'make' the stoker then knows that he cannot excuse himself—he cannot get away from the record on the chart. (See Fig. 1.)

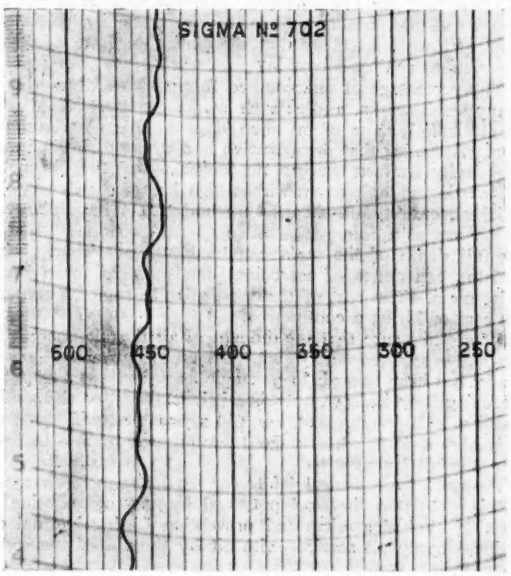


Fig. 1

Someone at this juncture may be tempted to ask: Can a small works afford dry mains, vacuum controller, Arkon gauge, quick indicating test light and C.V. recorder? Believe me, these things are relatively cheap. You can work dry mains without anti-dips, (although the cost of anti-dips would repay themselves even in the smallest works in one year's time), and the other items recommended are cheap, but I wish to emphasise that in my opinion *you cannot afford to be without them.* The cost of attending to complaints as the result of a variable quality and the taking in of inerts, plus the loss of revenue from dissatisfied consumers, far exceeds the cost of the apparatus recommended.

Employee Conditions

I have endured many headaches in my time as the result of not having sufficient capital to equip the works fully with gauges. Many nights especially have I spent going over the plant with a portable gauge searching for a choke. From these experiences I have been made to realise that I was indeed penny wise and pound foolish in those days. Sufficient vacuum and pressure gauges—also recording gauges if possible, are a necessity, not a luxury.

I have had the experience of men being so disinterested in their job, because of poor conditions, that I was aware they were only waiting until a better job turned up. I find now that with the introduction of the six day week, and improved all round conditions, including a good mess room, bath room,

lockers, and a really clean works some of my stokers arrive at and leave the works better dressed than the man in charge, and, far from showing any inclination to leave our employ, have become very gas-minded and push sales.

I am convinced that the fact that little progress has been made on many small works is due in no small measure to the mistaken idea that of necessity a gasworks must be dirty. This is quite wrong. If you whitewash and paint more frequently you will be pleasantly surprised at the number of compliments you will receive. I know from experience that the psychological effect is amazing. A badly cared for works create an impression of poverty and the public will have no confidence in that works. Such works do much to keep alive the fallacy that gas is a back number.

On the other hand, a well painted and clean works inspires the confidence it deserves, and I am sure that without exception such is a prosperous works. The one exception to painting I would make is the holders. Labour costs today are such that we should consider alternatives. I, personally, partially oil film, and who will deny that oil filming is quite effective in the combat against corrosion?

The percentage of unaccounted for gas is needlessly high in many small works, and as such works can least afford loss I would submit some of my own ideas on this vexatious question. Assuming that the excessive loss is due to broken mains and faulty services, we can no longer afford the old method of locating such leakages with sledge hammer and bar. The quickest, easiest, and cheapest method that I have discovered is the use of a compressor and rock drill. At least 20 holes the full depth of the main can be bored per hour. I have had the experience of searching for six weeks for a broken 6 in. main. The cost of that particular leakage far surpassed the cost of hiring a compressor.

I feel quite sure that the thought of all the hammering that would be required today, with the amount of metal on our roads, has been enough to persuade some managers to put off searching for a leakage, but when it is realised that the smallest possible leakage may cost, say, £10 a year, you will agree that it is almost impossible to go to too much trouble to locate and stop all leakages.

The use of mechanical joints for repairs to mains has completely out-dated the lead pot, and by way of reducing the costs of choked services and preventing further internal corrosion I spray all services with oil by the aid of the service cleanser.

For the past five years we in Omagh have used galvanised tubing only for new services and renewals, and we are hopeful that this will prove a good investment in the long run.

Developing Sales

For five years I was in charge of a small works with the annual sales of 5½ mill. and at the end of my tenure of office the sales had increased to 9½ mill. Only those who have had the experience of the very small works could possibly realise the amount of work entailed in almost doubling the sales.
was in conversation recently with the engineer of a large works who informed me that he had one consumer using 80 mill. In the small works consumers may average 8,000 cu.ft. per annum.

I would like then. very briefly, to relate some of the methods of encouraging the use of gas in small towns. The following are methods I use myself and from personal experience can guarantee how profitable they are. For example, in Omagh the sales for the year 1944 were 25 mill. and for the year ended March, 1949, sales amounted to 37 mill., a 48% increase.

The first essential to my mind is to believe in the product you are selling. If you are distributing clean, uniform, inert-free gas at a reasonable price, you have no need to apologise to anyone, so let no-one be patronising towards you. Secondly keep the word gas before the public. This can be done very cheaply by utilising the Gas Council's films, slides, literature, and such other aids as whist score cards, golf score cards, golf tees, playing cards, &c. In particular, distribute to all schools leaflets, blackboard charts, teachers' notes, &c. Educate the young, and you need not fear the future. If you cannot afford a showroom, make use of shop windows. Your goods on display attract people, and you will be pleasantly surprised at the results.

Thirdly, I personally am particularly keen to discuss with consumers the relative costs of gas and electricity in terms of the cost of a gas unit. The gas unit of 4,000 B.Th.U. is an old idea now. Why it was not universally adopted is beyond me because it seems to me that to expect a consumer to be able to compare our charge per therm or per thousand against the charge per electrical unit is asking too much.

For the benefit of those who may not have considered the question of the gas unit, a unit of gas of 450 B.Th.U. equals 1/25th of 222 cu.ft. equals 9 cu.ft. By arriving at the amount in cu.ft. of your gas you are better prepared to inform consumers what a unit of gas will do, and to compare costs.

Fourthly, concentrate on increasing consumption per consumer as undoubtedly this is the cheapest way of making profits. The sales per consumer in Omagh during 1944 were 21,000 cu.ft.; today they are 28,000 cu.ft.

Fifthly, never forget that a satisfied consumer is your best advertisement and, conversely, that a dissatisfied consumer can do untold harm.

Sixthly, encourage the purchase of appliances P.T.M. (*i.e.*, Pay through Meter).

In conclusion I wish to emphasise that I am very confident about our future. In some respects things may not have shaped themselves as we would have wished, but there is no need for the gloom or despondency all too prevalent today. Courage and cheerfulness can overcome all difficulties, and with enterprise and initiative in all ranks, the smaller works and our industry will go forward to a prosperity even greater than in any time past.

ATMOSPHERIC POLLUTION

Despite the war, the collection of statistics on atmospheric pollution was continued, but only recently has it been possible to analyse the data. This work is carried out by the Department of Scientific and Industrial Research with the aid of the Standing Conference of Co-operating Bodies who make local observations.

The 26th Report of the Investigation of Atmospheric Pollution covering the five years ended March 31, 1944, (H.M.S.O. price 2s. 6d., by post 2s. 9d.), has just been published. All the earlier reports were for periods of one year but there are some advantages in making this new report cover a five-year period. Observations of this type can best be judged statistically when they cover long periods.

During the war, the restrictions on emitting pollution were partly relaxed and for a period industrial concerns were encouraged to make smoke for camouflage purposes. Despite this, the records of local authorities and others co-operating in this nation-wide investigation do not show any appreciable increase of smoke in the air of the country as a whole.

An increase in the deposition of ash has been observed, however, and this may be due to increased industrial activity combined with overloading of industrial boilers and furnaces, and the tendency for industrial coal to contain more ash.

The invisible pollution of the atmosphere by sulphur gases is almost directly proportional to the quantity of coal burned irrespective of the size or type of the combustion appliance used. An interesting series of fluctuations in sulphur-dioxide measurements at a group of 20 stations was observed during the period 1935-44. From the middle of 1939 until the time of Dunkirk in 1940 there was a period of decreasing industrial activity with a corresponding fall in sulphur pollution. Thereafter there was a marked and rapid increase in the consumption of coal necessarily involved in the war-time production drive, and the result from the atmospheric pollution point of view was inevitable—a corresponding rise in sulphur-dioxide pollution.

The general conclusion from the report is that, contrary to the tendency during the 1914-18 war period, there was no marked and general increase of atmospheric pollution during the war period 1939-44, but the improvement of otmospheric cleanliness was temporarily halted. The report concludes on the note, however, that pre-war standards were far short of perfection and five years went by without any major attempts at improvement.

THE CHANGING OUTLOOK*

By JOHN WILKINSON, Assoc.M.Inst.Gas E., M.Inst.F. (Sheffield)

The author refers to the question of labour for the unpleasant job of emptying and filling purifier boxes—a 'black spot' from a manpower point of view. For the 12 months ended October, 1948, 294 men were interviewed for all classes of work by the Sheffield gas undertaking. Of these, 137 men were given jobs—46% of those who presented themselves for interview. Of the men started, 46 (33%) were allocated to the purifying house. At the end of the 12 months the complement of 12 men was maintained. The undertaking lost and gained a man at an average rate of one a week; and this in spite of the fact that the work carries a higher rate of pay than is the normal. Mr. Wilkinson suggests that greater attention should be paid to further mechanisation, to the installation of tower purifiers, and to liquid purification. He asks whether a capital expenditure figure of £52,500 would justify considering the installation of a plant of the 'Manchester' process type. The query should provoke thought.

PRESENT day conditions on the works from a labour standpoint are at times a problem, and although not unduly pessimistic, I believe that if we are to survive this second industrial revolution we must do some sober stock-taking.

In September last year, in an address to the North British Association of Gas Managers, Sir Harold West described an experiment in the training of boys and men to take up their ultimate positions with his firm, Newton Chambers & Co., Ltd. The address revived happy memories of an outstanding visit when we were privileged to see the training being applied, to wonder and admire, to reflect on the amount of thought behind the scheme, and to applaud the good results obtained.

Selection tests with regard to new employees as applied to some industries are not readily applicable to the gas industry from a works standpoint, and a prospective employee is judged principally from his physical capabilities (incidentally often a misleading and deceiving test) and also his suitability for a particular job of work. For example, a man of 5 ft. stature would be more suitable as a Telpher Operative than a 6 ft. man; selection of this nature is very simple and logically sound.

Mr. F. W. Taylor, an American born in 1856 and died in 1915, who played a big part in the development of the steel industry in America and who was the pioneer in the study of manpower, worked on these simple lines with remarkable results. The study of manpower has now been developed to a high degree, but Taylor's principles are still the basis. In the first place the study of manpower was developed primarily to increase production per employee; but this led eventually to a further study and development necessitated by the boredom and fatigue brought on by repetition work. A more general branch has now been developed and is applied to most industries under the name of welfare.

There has been since the beginning of the present century, but most noticeably since the end of the 1914-18 war, a remarkable change in the relation betwen management and labour, and it is generally recognised that attention to the human factor is at least as important as mechanical and technical efficiency in the success of any business enterprise. But, the attention to the human factor appears to be not vitally important when one studies the facts given by Mr. Bath in a paper to the Midland Juniors in February, 1948. Mr. Bath states that during a period of 18 months from June, 1946, to December, 1947, the total number of employees engaged for all types of work was 221, which represents approximately 30% of all who presented themselves for interview, and the total number who left their employment during this same period was 197. There was therefore a net gain of 24 men. These figures show an increase of only 10% to the number on the payroll, obtained by a float of employees in and out of service approximating to 75% of the total number engaged.

These figures raise two questions. Is the present situation due to working conditions in the gasworks, or is the human element undergoing a changed outlook? The undertaking I have the honour to serve has suffered from the same trend, and I understand it is quite common in most gas undertakings, and indeed throughout industry generally. The statement that 'the stoker is a type of skilled workman who is dying out,' is only too true, and when coupled with a remark couched in a similar vein made by a member of this Association at Bradford last year, calls for some serious thought. The member cited purification as his main theme, but he echoed the sentiment about the stoker, and confirmed my belief that today there is a change in attitude towards certain classes of work on the part of the majority of younger employees.

It is my belief that this change in outlook is permanent, and that workmen of today will not tackle certain jobs on the works without question as did previous generations.

May I refresh your memories with a brief description of the Thorncliffe Apprentice Training Plan, described by Sir Harold West. It comprises: Testing, Grading, Selection: Pre-entry course—one month; Initiation, Orientation—Background Information; Sense of Belonging and Purpose; followed by craft course—one month; Foundry—Constructional Engineering—or Painting and Decorating Courses, followed by five months in shop, followed by craft course—one month, followed by five months in Shop, &c., to 18 years of age.

This course covers all youths up to 18 years of age. After this we must assume the youths pass to the particular department in which they have shown most aptitude to complete their apprenticeships to the age of 21.

In the light of past unpleasant experience with regard to lack of full employment, I think it behoves any person today to carve out a niche, and not be tempted, or lured by possibly temporary riches, but to regard this carrying out period as an insurance.

In this connection one's thoughts turn to one of the ancillary parts of a gasworks, namely, the dry purification plant, which is one which gives most trouble from the labour standpoint. Details taken from our works records of new employees will illustrate that the dry purification plant is a 'black spot' from a manpower point of view.

For the 12 months to October, 1948, 294 men were interviewed for all classes of work, 137 men were started, or 46% of the men who presented themselves for interview; 46 men or 33% of the total of men started were allocated to the purifying house. At the end of the 12 months period our complement of 12 men remained at full strength. These figures show that we lost and gained a man at an average rate of one per week. This does not give settled conditions, nor is it conducive to efficient working.

The duty today of any efficient and progressive undertaking is to obviate where possible, and to ease where that is not possible, the nervous and physical strain of industrial employment, and to a large extent this has been borne in mind in the development of the dry purification plant that we have at our disposal.

The building is one of three floors and roof. Running down each long side of the building are railway sidings, standard gauge. The oxide when emptied from the rail trucks can be moved about the full length of the ground floor if necessary, by electrically driven portable conveyors. These conveyors can be worked in series to give either a short or long travel at will. Portable oxide disintegrators are in operation. If a batch of oxide is to be fouled a second time, it is elevated to the top floor (as is also new oxide) where again there are portable conveyors to transport the oxide to any desired spot. When emptying a box pneumatic spaders are used to break out the mass of oxide. No turning of the oxide for revivification purposes is carried out as practised in some works, as we are satisfied from actual experience that this is not necessary where mechanical disintegrators are used. A complement of 18 is employed when emptying and filling a box, 12 men as the

* From a short paper presented to the Yorkshire Junior Gas Association.

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normal complement, the extra six men are drafted in for the special job of emptying and filling a box. The time taken to complete the work of handling the 300 tons of oxide required per box, *i.e.*, 150 tons of oxide out of the box (ignoring the increased weight due to sulphur) and 150 tons of oxide back into the box, is one and a half working days, or 12 to 14 hours. I would also like to mention that this class of work carries an increased rate of pay. Due to mechanisation, actual manual labour is cut to a minimum. Where then lies the trouble that is experienced when this particular operation takes place? Improvements in handling have shown returns in higher average efficiencies, in lower labour costs, and in the interests of the employees. But too often we have been faced with a point blank refusal to carry out the work of box emptying when detailing the necessary extra labour. The inevitable result is that a man is lost, and in most cases a good man. In our case these men are to a degree 'picked,' but there is no alternative but to lose the man, as allowing an employee to choose his own work cannot be tolerated if authority is to be maintained.

Refusals to Work

This experience is in no way peculiar to our undertaking, as evidence of this nature is often to hand. Mr. Singleton, in his address to this Association, mentioned that where men were wanted for the purifying house, there appeared to be a definite shortage. Why does a situation like this occur? There is actually no new work on a gasworks. The same processes have been materially in existence for a generation, but it is only in recent years that this attitude has arisen.

A man was detailed one particular day to report to the purifying foreman who gave him his work, along with the other men, emptying a box. After a period of one hour the man left the job and refused to carry out any more work of that nature. When told that that was his job for the day and no other work the man asked for his cards and his request was granted.

During a discussion as to why the man refused to do the work, it was mentioned that this class of work had been going on for years, to which his remarkable reply was that we were now dealing with a new generation who did not intend to do work of that nature. I could not agree with him in his attitude to the job on hand, but the man spoke rationally, and his refusal was given with no sign of bitterness or rancour; it was just that the work was not palatable. This instance is by no means an exception, but a rather too frequent occurrence in varied forms.

For the future we must face up to the facts and where practicable, and even in future planning, consider mechanisation as much as possible in this particular department. The obvious remedy is to be bold and adopt forthwith recent new ideas in the process for the removal of sulphuretted hydrogen, and in this direction our thoughts turn to tower purifiers, on which an excellent paper was given by Mr. Martindale to this Association last year. Mr. Martindale stated that three men only are required to carry out the work in connection with this type of plant; but we were given to understand that to install a set of tower purifiers of less than 12 mill. cu.ft. capacity would not justify the capital expenditure on certain parts of the system. Consequently on this point tower purifiers must be passed by as being a normal part of a gasworks plant below this figure. But even to an undertaking which is justified in installing tower purifiers, there is, in my opinion, a disadvantage, although not so apparent at the present time, but evident in a minor degree, and one which will be definitely more pronounced in the future—a growing surplus of spent oxide.

Spent Oxide Surplus

Difficulty is being experienced by some undertakings in marketing spent oxide, and if this persists the purification costs generally will be seriously affected on the 'wrong side.' Is this growing surplus of spent oxide due to a gradual decline in the use of this material in the manufacture of sulphuric acid?

Referring back to a remark that a scheme in this paper 'did not justify the enormous capital expenditure' the following statements are somewhat astonishing. Mr. J. D. C. Woodall, in a paper given before the Southern Association of Gas Engineers and Managers in 1948, suggested that the saving of one man justified a capital expenditure of not less than £2,000, and that during the discussion the figure was placed as high as £3,700. Mr. W. T. Hird, in his Presidential Address to this Association in April, 1948 confirmed the latter figure by saying that on a 3% interest and sinking fund basis on a repayment of 20 years, the wages of a labourer represented today a capital sum of £3,750. Is the cost of new plant so terrific when a labourer is valued at such a high figure?

Comparative Costs

It has been stated that our normal complement in the purifying department is 12 men, but to this must be added the charge hand and one purifier attendant. The purifier attendant carries out the necessary changing of the rotations of the sets and logs pressures, temperatures, &c. This makes a total of 14 men. Now if we take Mr. Hird's figure of £3,750 as the value of one man, our purifying department complement represents a potential capital expenditure of $14 \times 3{,}750 = £52{,}500$. Would this capital expenditure figure justify considering the installation of, say, a plant of the 'Manchester Process' type. This figure of £52,500 would be reduced by as much as the number of men that would be required to staff this particular type of plant. Without going too deeply into the question of economics this proposition looks very attractive by reason of the two main points:—

(1) Small amount of labour required.
(2) No large bulk of spent material to be disposed of. (This second point is of vital importance.)

The relative advantage and disadvantages of these two types of plant, tower purifiers and the 'Manchester Process,' provide enough material in themselves for a whole paper. In this short paper I make no attempt to find a solution to the problem of manpower as applied to dry box purifiers, or to give any fixed suggestions.